Winter 2020

A Multi-State Evaluation of the Knowledge of the Background and Dangers of Popular Fad Diets Among Cooperative Extension Agents in Family And Consumer Sciences

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A MULTI-STATE EVALUATION OF THE KNOWLEDGE OF THE BACKGROUND AND DANGERS OF POPULAR FAD DIETS AMONG COOPERATIVE EXTENSION AGENTS IN FAMILY AND CONSUMER SCIENCES

by

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A Thesis Presented in Partial Fulfillment of
the Requirements of the Degree Master of
Science

COLLEGE OF APPLIED AND NATURAL SCIENCES
LOUISIANA TECH UNIVERSITY

March 2020

LOUISIANA TECH UNIVERSITY

GRADUATE SCHOOL

December 18, 2019
Date of thesis defense

We hereby recommend that the thesis prepared by

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entitled **A Multi-State Evaluation of the Knowledge of the Background and Dangers of Popular Fad Diets Among Cooperative Extension Agents in Family And Consumer Sciences**

be accepted in partial fulfillment of the requirements for the degree of

Master of Science in Nutrition & Dietetics

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ABSTRACT

Cooperative extension provides communities with research-based information in several areas including family and consumer sciences (FCS) (Franz & Townson, 2008). Because FCS agents teach communities about dietary guidelines, it is important that they are aware of the latest nutrition research. This study assessed the knowledge of popular fad diets and their potential adverse effects among FCS cooperative extension agents, and its relationship among the variables of location, professional certifications held, years of extension work experience, membership in professional associations, and education level. FCS extension agents in Louisiana, Texas, Arkansas, and Mississippi were emailed an online survey, which collected demographics and assessed their knowledge about three fad diet categories (low-carbohydrate, intermittent fasting, detoxes and cleanses) and potential adverse effects. Data collection lasted for four weeks. One hundred and thirty-eight agents were analyzed. Frequency testing was used for descriptive statistics of demographic data. Respondents' knowledge about fad diets and adverse effects was assessed with test scores from knowledge items embedded in the survey. The average total knowledge score among respondents was 70%. Univariate ANOVA was used to compare scores with education level, years of experience, membership in professional associations, certifications held, and the state in which participants were employed. A *p*-value of ≤ 0.05 indicated significance. RDN, DTR, and CHES certifications had a significant association ($p = 0.03$) with knowledge adverse effects of fad diets. The results

suggest agents who hold these credentials may have more knowledge about adverse effects of fad diets. Further research is needed to validate this association.

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CHAPTER 1

INTRODUCTION

Cooperative Extension Services has long been known for its ability to effectively deliver research-based information to the public (Franz & Townson, 2008). The network of professionals in research, outreach, and teaching that make up cooperative extension provides communities with the information and resources needed to learn and grow in a variety of areas, including agriculture and natural resources, youth and community development, and family and consumer sciences (FCS) (Franz & Townson, 2008). Extension agents listen to the concerns of their community, answer questions, and educate community members in an effective and useful manner (Zacharakis, 2008). FCS agents teach the public about dietary guidelines and are at the forefront of questions about diet trends (Horacio Atiles & Eubanks, 2014). Because the diet industry is constantly changing and new trends are continuously emerging, it is important that FCS agents are aware of the latest nutrition research. In addition, FCS agents must have a sound human nutrition background so they are able to understand the premises of these diets (Horacio Atiles & Eubanks, 2014; Cason & Haines, 2002).

Fad diets have a long history of convincing people to consume certain foods or supplements in order to support overall health (Matarese & Pories, 2014). It is estimated that over 1,000 weight loss diets have been created, with that number consistently growing. Fad diets comprise a large number of these weight loss diets. Fad diets are

known for recommending the consumption or elimination of specific foods or food groups and usually have little to no scientific evidence-based research supporting these recommendations (Matarese & Pories, 2014). Though many fad diets can promote weight loss, especially rapid loss, the long-term success in weight management is not as promising (Phelan, Wyatt, Hill, & Wing, 2006). Research has proven success in long-term weight management does not come from following fad diets, but rather by engaging in moderate to vigorous levels of physical activity, limiting fast food, and consistently consuming a diet low in calories and moderate in fats (Phelan et al., 2006).

Statement of the Problem

Cooperative Extension Services possess an advantage in influencing the health of communities, as their programming promotes health behavior change through education (Lynch, Fuhrman, Duncan, & Hanula, 2015). Teaching the public about proper nutrition is an essential component of an FCS agent's job; therefore, it is important agents are aware of current nutrition and health related trends in the public and what the research says about these trends (Bailey, Hill, & Arnold, 2014). Fad diets are becoming increasingly popular and trends frequently change, leaving the public seeking reliable answers on the safety and efficacy of these meal plans (Bailey et al., 2014; Carbone & Zoellner, 2012; Hornick et al., 2013). Therefore, there is a need for research to assess the current knowledge of FCS agents pertaining to fad diets in order to develop effective training to support their role (Carbone & Zoellner, 2012). Educational resources and professional development available for FCS agents that address this area are limited, which presents a potential problem (Bailey et al., 2014). When agents were surveyed

regarding their professional development needs, they expressed a need for more technical field-related education, research education, and continued formal education (Bailey et al., 2014).

Purpose

The purpose of the study was to assess the general knowledge of popular fad diets (low carbohydrate, intermittent fasting, detoxes and cleanses) and their potential adverse effects among FCS cooperative extension agents, and its relationship among the variables of location, professional certifications held, years of extension work experience, membership in professional associations, and education level. The study surveyed FCS extension agents in Louisiana, Texas, Arkansas, and Mississippi to learn more about their knowledge of current fad diets and their potential adverse effects, as well as factors that influence their knowledge. These states were chosen due to their close proximity to Louisiana.

Hypotheses

The following hypotheses were tested:

1. There will be no significant difference in FCS extension agents' knowledge of fad diets based on the state in which they are employed in, certifications held, years of experience, membership in professional associations, or education level.
2. There will be no significant difference in FCS extension agents' knowledge of the potential adverse effects of fad diets based on the state in which they are

employed in, certifications held, years of experience, membership in professional associations, or education level.

Justification

As community employees, extension agents respond to members' needs, which include providing scientific-evidence based answers to unique and difficult questions. FCS agents' knowledge needs to remain current with diet fads as trends are constantly changing and new diets seem to emerge weekly. It is important to assess FCS agents' knowledge of these current trends in order to provide effective training and professional development opportunities to assist them with educating the public on relevant topics.

This study will provide insight about the strengths and potential deficits in knowledge among FCS extension agents regarding popular fad diets and their potential adverse effects. This study will also be useful in identifying factors that influence access to professional development needed to obtain knowledge. Understanding agents' areas of proficiency, knowledge deficits, and factors influencing knowledge will help state cooperative extension offices and professional organizations in planning useful training and professional development opportunities. Consistent professional development and the mindset of a lifelong learner are critical components of successful cooperative extension agents.

CHAPTER 2

REVIEW OF LITERATURE

Cooperative Extension plays a major role in educating communities about proper nutrition behaviors (Cason & Haines, 2002). Advances in technology and new diet trends present a potential challenge in keeping up with popular diets (Horacio Atiles & Eubanks, 2014). Questions are commonly raised by community members regarding fad diets and other nutrition trends (Horacio Atiles & Eubanks, 2014).

Cooperative Extension and Extension Agents

The Cooperative Extension Service (CES), an organization based on teaching, outreach, and research, is a partnership between the U.S. Department of Agriculture (USDA), state land-grant universities, and state and local governments (Gornish, Coffey, Tiles, & Roche, 2018). The goal of CES is to improve the lives of citizens by delivering research-based information to the public through a variety of mediums, including publications, media, and programming (Gornish et al., 2018). CES offers educational programs and information in agriculture, 4-H youth development, natural resources, community development, FCS, and food and nutrition (Franz & Townson, 2008). CES is usually county- or parish-based, which accommodates local outreach needs (Franz & Townson, 2008). CES has offices in almost every parish and county in the United States (Zacharakis, 2008).

CES was established through each state's land-grant university (Franz & Townson, 2008). In 1862, President Abraham Lincoln signed the Morrill Act, in which each state was granted land to be used or sold in order to raise funds for the creation of state land-grant universities. These universities were created with the intent to provide research and education to meet the needs of each state's agricultural community. In 1890, the Morrill Act was revised to allow for annual federal funding for each state to support their land-grant university. In turn, the universities gained the responsibility of serving limited-resource audiences, which were often farmers. These changes in land-grant universities helped bring a competitive edge to agriculture in the United States by educating and training those who could help the industry grow (Franz & Townson, 2008).

CES began in 1914, though the idea of extension work started about 10 years earlier (Franz & Townson, 2008). In 1904, cotton fields across the Southern part of the United States were threatened by the boll weevil. To help alleviate this issue, the USDA hired agents to visit farms and educate the farm owners on ways to terminate the boll weevil. Agents taught the farmers using demonstration-based education, which was so effective the USDA began brainstorming and experimenting on ways to deliver research-based information to the public, including moveable schools, research bulletins, traveling workshops, and lectures. Finally, in 1914, the Smith-Lever Act was signed, which granted funds to land-grant universities for hiring extension educators across each state (Franz & Townson, 2008). The initial vision of extension education was to help rural Americans develop a profitable and equitable business using education to enhance management of their resources and increase production using conservation methods (Zacharakis, 2008). Over time, CES grew to include a variety of educational services,

including wildlife, forestry, home economics/FCS, and 4-H, to name a few (Franz & Townson, 2008).

Each state's CES varies in programming and career opportunities, as it is primarily organized from the state level and the state's corresponding land-grant university (Gornish et al., 2018). While its historical roots lie in rural communities, CES has grown to serve states as a whole, with educational opportunities for all communities (Zacharakis, 2008). With variations by state and even by county or parish, no two CES offices are the same, and each has different programmatic goals and organizational needs. Since the beginning of extension work, educational initiatives and programs have been developed based on the needs of communities served. Instead of a mindset of program development "for the people", CES works with the people of each community to create programs that help improve the lives of citizens and address specific community needs. This is accomplished by using input from community advisory committees who are charged with guiding agents in developing programming to meet the needs of the people served (Zacharakis, 2008).

Extension Agents, also called County Agents, Educators, or Advisors, are the heart of CES (Gornish et al., 2018). These individuals generally serve at a county- or parish-level, with many agents serving multiple neighboring counties or parishes. The primary role of an extension agent is to educate the public by bringing research-based information to their local communities. Additional duties of an extension agent may include organizing meetings with community members, working with stakeholders, writing publications, and serving as a resource for any questions a community member may have (Gornish et al., 2018). In addition to these roles, extension agents often recruit,

train, and manage community volunteers to help educate others and teach programs (Franz & Townson, 2008). Support from volunteers help agents to expand their reach. Some of the more common volunteer groups overseen by extension agents include Master Gardeners, led by a local horticulture agent, and 4-H leaders, which are managed by 4-H agents (Franz & Townson, 2008). Though there are general expectations for extension agents, each agent's work can be very different from another (Gornish et al., 2018). Agents rely on community input and needs defined by stakeholders in advisory councils, so agents in the same field with the same job description working in different counties or states are often seen doing different programs and work. Not only is each agent's work unique, but each day on the job can be completely different from the day before. Agents working in CES can expect to work in a fulfilling job that cultivates meaningful relationships with their community members (Gornish et al., 2018).

Requirements to Become a Cooperative Extension Agent

One must possess a college degree in order to become an extension agent (Scheer, Ferrari, Earnest, & Conners, 2006). Some states require a bachelor's degree, while others require a master's degree. These degrees must be relevant to the area in which the agent practices (Scheer et al., 2006). In many states, including Louisiana, CES requires only a bachelor's degree, but completion of a master's degree is required for career promotion and advancement (Gornish et al., 2018). Having comprehensive background knowledge in the area they teach is important, as extension agents are a valuable information resource for the public (Gornish et al., 2018).

In addition to fulfilling the educational requirements for the position, extension agents should also possess a variety of skills to help them flourish in their career (Gornish et al., 2018). Strong oral, written, and interpersonal communication skills are vital to succeed as an agent. CES programs strengthen as community relationships grow, so charisma, sociability, and the ability to build, cultivate, and maintain relationships are important characteristics an extension agent should possess (Gornish et al., 2018).

Educational Opportunities for FCS Agents

The National Extension Association of Family and Consumer Sciences (NEAFCS) is a professional association designed for cooperative extension professionals who work in the field of FCS (National Extension Association of Family and Consumer Sciences, 2018a; Scholl, Syracuse, & Kneip, 2011). This association is a nationwide information resource for extension professionals to obtain professional development, network, and build partnerships with other professionals (National Extension Association of Family and Consumer Sciences, 2018a; Scholl et al., 2011). NEAFCS provides professional development for members and leads in public policy to promote FCS agents (Scholl et al., 2011).

The *Journal of NEAFCS*, which is published annually, contains research conducted by its members (National Extension Association of Family and Consumer Sciences, 2018b). NEAFCS also regularly hosts professional development webinars on a variety of topics in which members have expressed an interest (National Extension Association of Family and Consumer Sciences, 2018c). In addition to online member resources, NEAFCS hosts an annual conference every year, where members attend

educational sessions and workshops, receive awards for programming efforts, participate in organization business meetings, and receive useful tools and resources for their job (National Extension Association of Family and Consumer Sciences, 2018d).

The last three editions of the *Journal of NEAFCS* by Ransom and Wright (2017, 2018) and Weatherford and Ransom (2016) contained no research articles pertaining to current fad diets or diet trends. No webinars listed on the NEAFCS website since 2012 pertained to nutrition trends or fad diets (National Extension Association of Family and Consumer Sciences, 2018c). In the past two years, only one educational session at an NEAFCS conference discussed nutrition trends. The session, titled "Strategies for Addressing Nutrition Misinformation," helped members learn strategies to address common nutrition misinformation that clients may have (National Extension Association of Family and Consumer Sciences, 2018e). None of the conference sessions, however, gave extension professionals research-based information about current nutrition trends and fads (National Extension Association of Family and Consumer Sciences, 2018e).

Other professional associations for cooperative extension agents in FCS include the Society for Nutrition Education and Behavior (SNEB) and the Academy of Nutrition and Dietetics (AND) (Academy of Nutrition and Dietetics, 2015; Society for Nutrition Education and Behavior, 2011). SNEB is an international association which aims to provide professional development opportunities for professionals working in health promotion and nutrition education (Society for Nutrition Education and Behavior, 2011). Membership opportunities include networking and professional development opportunities, access to publications, and public policy updates (Society for Nutrition Education and Behavior, 2011). AND is a professional association for registered

dietitians, dietetic technicians, those who have completed an ACEND (Accreditation Council for Education in Nutrition and Dietetics) accredited undergraduate program, and those who have earned a master's or doctoral degree in a nutrition-related field (Academy of Nutrition and Dietetics, 2015). AND membership provides professionals with field-related professional development opportunities and useful evidence-based nutrition information (Academy of Nutrition and Dietetics, 2015)

Top Fad Diet Categories

Three popular diet categories today include low-carbohydrate and ketogenic diets, intermittent fasting regimens, and detoxes and cleanses (Joshi & Mohan, 2018; Katz & Meller, 2014; Hooper, 2014; Mullin, 2010). A common characteristic of these diet patterns is that they involve the restriction of foods to some degree (Katz & Meller, 2014). Low-carbohydrate, intermittent fasting, cleanse and detox diet patterns continue to grow in popularity, but substantial research to support their effectiveness is lacking (Hooper, 2014; Katz & Meller, 2014; Mullin, 2010).

Low-Carbohydrate and Ketogenic Diets

One of the most popular diet methods for weight loss is the significant reduction of total carbohydrates consumed (Churuangsuk, Kherouf, Combet, & Lean, 2018). Over the past few years, low-carbohydrate diets have gained popularity for weight loss and they have received more attention in scientific publications and the media (Churuangsuk et al., 2018). This dietary approach has been controversial among researchers (Roberts & Das, 2015). Proponents claim the diet accelerates body fat oxidation which leads to fat loss (Roberts & Das, 2015). Low-carbohydrate diets can range in intensity, from

consuming less than 45% of carbohydrates from calories, which is the USDA's current minimum recommended daily intake, to the ketogenic diet, which is composed of about 90% of calories from fat, low to moderate protein, and minimal to no carbohydrates (Brouns, 2018; Zhang et al., 2016; U.S. Department of Health and Human Services and U.S. Department of Agriculture, 2015). Most low-carbohydrate diets replace carbohydrates with fat, which is why low-carbohydrate diets are commonly referred to as "low-carbohydrate high-fat" (LCHF) diets (Brouns, 2018).

Types of Low-Carbohydrate Diets. There is no single definition of a low-carbohydrate diet, as recommendations for total carbohydrate intake often vary (Buyken et al., 2018). The 2015-2020 Dietary Guidelines for Americans recommend a moderate carbohydrate intake, which is 45-65% of total daily calories for all ages and genders (U.S. Department of Health and Human Services and U.S. Department of Agriculture, 2015). A low-carbohydrate diet, therefore, can be defined as any diet with a carbohydrate consumption of less than 45% of total daily calories (Van Wyk, Davis, & Davies, 2016). As shown in Table 1, there is no clear picture of the amount of carbohydrates consumed on a low-carbohydrate diet, which poses problems when examining research available on low-carbohydrate diets as definitions can vary between studies (Brouns, 2018).

Table 1.

Common Low-Carbohydrate Diet Plans

Diet	Diet Plan	Source
Atkins Diet	20 grams carbohydrates/day or less during "induction" for 2-3 months, then 50 grams carbohydrates/day or less afterwards for "ongoing weight loss" stage.	(Gardner et al., 2007)
Ketogenic Diet	No more than 20g carbohydrate/day. 90% fats, 1g/kg protein, minimal carbohydrates	(Gibson et al., 2015) (Zhang et al., 2016)
South Beach Diet	Initial restriction of <10% of calories from carbohydrates, then more carbohydrates introduced in weeks 3-5	(Clifton, 2011)
Zone Diet	40% carbohydrate, 30% protein, 30% fat	(Stein, 2000)
Dukan Diet	"Attack" phase: ketosis. Only eating meat and 1.5 Tbsp oat bran "Cruise" phase: meat + 32 non-starchy vegetables + 2 Tbsp oat bran "Consolidation" phase: meat + 32 non-starchy vegetables + fruit + starchy foods + whole grain bread + cheese + 2 Tbsp oat bran "Stabilization" phase: all foods, 3 Tbsp oat bran	(Dukan Diet, 2013)
Ideal Protein	Phase 1 (follow until all weight lost): 3 ideal protein foods, 8oz protein for dinner, 4 cups select vegetables, unlimited raw vegetables and lettuce Phase 2 (follow for 14 days): 2 ideal protein foods, 8 oz protein for lunch and dinner, 4 cups select vegetables, unlimited raw vegetables and lettuce Phase 3: 1 ideal protein food, 8 oz protein for breakfast, lunch, and dinner, 4 cups select vegetables, unlimited raw vegetables and lettuce Phase 4: Maintenance regimen. Not specified	(Ideal Protein, 2018)

Weight Loss. One well-known advantage to low-carbohydrate diets is the initial rapid weight loss (Matarese & Pories, 2014; Mohorko et al., 2019). A large-scale systematic review exploring the effectiveness of low-carbohydrate diets found the diet can be just as effective as energy-restricted or low-fat diets in weight loss (Churuangsuk et al., 2018). Their success could be attributed in part to their simple design, which makes it easy for all to understand and follow, though the overall adherence rate to this diet is not unique from other diets. While the systematic review found low-carbohydrate diets can be useful in weight loss, it also found these diets come with the risk of unfavorable blood lipid level outcomes. The researchers also noted no sufficient long-term clinical evidence to support low-carbohydrate diets for use by the general population (Churuangsuk et al., 2018). A systematic review and meta-analysis found little to no difference in weight loss when a low-carbohydrate diet and a balanced diet were compared (Naude et al., 2014). Another systematic review and meta-analysis compared low-carbohydrate diets with diets higher in carbohydrates for management of type 2 diabetes and found no significant difference in weight loss between the two groups (Korsmo-Haugen, Brurberg, Mann, & Aas, 2019). While low-carbohydrate diets had more positive weight loss results when followed for six months or less, long-term results did not differ with diets higher in carbohydrates (Korsmo-Haugen et al., 2019).

A diet rich in high-fiber beans was compared with a low-carbohydrate diet to assess the effects of both regimens on obese adults (Tonstad, Malik, & Haddad, 2013). Both groups decreased their weight, waist and hip circumferences, Body Mass Index (BMI), and blood pressure. One notable benefit of the fiber-rich bean diet was a decrease in low-density lipoprotein (LDL) cholesterol and total cholesterol levels, which was not

observed in the low-carbohydrate dieters (Tonstad et al., 2013). LCHF diets, when examined in rodents, led to an increase in body fat (Caton et al., 2012; Nilsson et al., 2016). Nilsson et al. (2016) also observed mice on a LCHF diet experienced impaired aerobic capacity and cardiac function. Another study conducted on mice aimed to examine the effects of a LCHF diet on obesity and prediabetes (Lamont, Waters, & Andrikopoulos, 2016). The obese and prediabetic mice were fed either a LCHF diet or a standard diet. Those fed a LCHF diet experienced an increase in weight, fat mass, and glucose intolerance. This study challenges the idea that LCHF diets can produce beneficial results in those who are prediabetic (Lamont et al., 2016). When comparing low-fat diets to low-carbohydrate diets in adults, studies have found no significant difference in weight loss (Mohler et al., 2013; Wycherley et al., 2010).

Data from the National Weight Control Registry were used to evaluate the effectiveness of low-carbohydrate diets among those who have successfully lost 30 or more pounds and kept the weight off for at least a year (Phelan et al., 2007). Only 10.8% of successful dieters followed a low-carbohydrate diet and tended to have a shorter weight maintenance duration after their weight loss in comparison to other successful weight losers (Phelan et al., 2007). Data on 9,594 people from the Korean National Health and Nutrition Examination Survey helped determine the effects of carbohydrate intake on body composition (Kim & Song, 2018). The proportion of carbohydrates men consumed was positively correlated with their total limb lean mass. In women, skeletal muscle mass and total limb lean mass increased and trunk fat percentage decreased as carbohydrate intake increased. Many factors can influence lean mass, skeletal muscle

mass, and trunk fat, but this study helps to discredit the theory that carbohydrates in general promote weight gain (Kim & Song, 2018).

Potential Benefits. In a comparison of the effects of a low-carbohydrate diet versus a low-fat diet in 105 overweight adults with Type 2 Diabetes, initial weight loss was faster for those following a low-carbohydrate diet, but at one year the amount of weight lost was similar in both groups (Davis et al, 2009). One benefit the low-carbohydrate dieters experienced was an increase in high-density lipoprotein (HDL) cholesterol (Davis et al., 2009). A comparison of 33 obese subjects following a very-low-carbohydrate diet with 36 obese subjects following a low-fat diet found both groups experienced similar weight and body fat loss as well as decreased insulin resistance, blood pressure, fasting glucose, and C-reactive protein (Brinkworth, Noakes, Buckley, Keogh, & Clifton, 2009). The low-carbohydrate group, however, also experienced greater reductions in triglycerides and greater increases in HDL cholesterol (Brinkworth et al., 2009). An observational study examining 11 adults with Type 1 Diabetes following a ketogenic diet found hemoglobin A1C levels close to the normal range and little glycemic variability among participants (Leow, Guelfi, Davis, Jones, & Fournier, 2018).

Diet Quality**.** Medical professionals often question LCHF diets due to the foods people typically consume or restrict when following these diets (Retterstol, Svendsen, Narverud, & Holven, 2018). Increased saturated fat consumption, which can negatively affect cardiovascular health, is common in LCHF diets (Retterstol et al., 2018). Since 1961, the American Heart Association has recommended a reduction of saturated fat in the American diet due to its role in increasing LDL levels in the blood, which leads to an increased risk of cardiovascular disease (Sacks et al., 2017). Intake of saturated fats may

also be associated with an increased mortality risk (Ricci, Baumgartner, Zec, Kruger, & Smuts, 2018; Zhuang, Cheng, Wang, Zhang, & Jiao, 2019; Zhuang et al., 2019). In Sweden, as LCHF diets have increased in popularity over the years, blood cholesterol levels also have had a parallel rise due to the resulting increase in saturated fat consumption (Mann, McLean, Skeaff, & Morenga, 2014). Guess (2017) used data from the United Kingdom's National Diet and Nutrition Survey (NDNS) to compare dietary intake in those following a reduced-carbohydrate diet (<40% carbohydrates from calories) to those with a normal carbohydrate intake (≥40% carbohydrates from calories). After adjustments were made to account for socioeconomic status, adults following a reduced-carbohydrate diet consumed significantly higher amounts of red meat than those with a normal carbohydrate intake (Guess, 2017). Another study examined the differences between adults following a LCHF diet, other diet, or no diet using an online survey that assessed food choices, motivation, diet characteristics, and health perceptions of 330 participants (Clarke & Best, 2017). LCHF dieters were more likely to perceive vegetables, whole grains, and vegetable oils as harmful to their health and animal fats as beneficial. Perceptions among LCHF dieters matched their reported diet behaviors (Clarke & Best, 2017). While restricting some refined carbohydrate-rich foods may be beneficial to health, loosely recommending a restriction of all carbohydrates eliminates many healthful, fiber-rich foods, including fruits, vegetables, legumes, and whole grains (Mann et al., 2014). Moreover, low-carbohydrate diets are commonly known for being nutritionally inadequate, as they are generally low in fiber, potassium, folate, calcium, thiamin, iron, magnesium, and vitamins B6, A, and E (Crowe, 2005).

Risks and Adverse Effects. Short-term side effects seen in LCHF diets include fatigue, halitosis, headache, polyuria, hair loss, gastrointestinal discomfort, changes in sleeping patterns, and stomach cramps (Crowe, 2005; LeCheminant et al., 2007; Stocks, Betts, & McGawley, 2016). Those who follow ketogenic diets frequently complain of constipation and reflux (Kossoff & Haney, 2016). A low-carbohydrate diet has been shown to increase mortality risk in cohort studies (Fung et al., 2010; Sjogren et al., 2010).

A LCHF diet can be potentially harmful to cardiovascular health (Retterstol et al., 2018). Studies examining the effects of low-carbohydrate diets found they caused an increase in LDL cholesterol (Brinkworth et al., 2009; Mansoor, Vinknes, Veierod, & Retterstol, 2016; Retterstol et al., 2018). One study examined the effects of a LCHF diet (less than 20 grams of carbohydrate per day) on LDL measurements in healthy, young adults after three weeks. Those following a LCHF diet experienced increases in LDL levels ranging from 5-107%; the average increase in LDL was 44% (Retterstol et al., 2018). Obese rats fed a LCHF diet in a lab after a myocardial injury experienced impaired recovery of cardiac function and increased oxidative stress compared to those who were fed a low-fat control diet (Liu & Lloyd, 2013). A comparison of the effects of a very-low-carbohydrate diet with a low-fat diet after one year found the low-carbohydrate diet led to impaired flow-mediated dilation, which could pose a potential risk for vascular function (Wycherley et al., 2010). While favorable A1C levels were shown among adults with Type 1 diabetes following a ketogenic diet, dyslipidemia was observed, with 82% of participants experiencing elevations in total and LDL cholesterol (Leow et al., 2018). A systematic review and meta-analysis examined the effects of low-carbohydrate diets on

cardiac health outcomes and found all-cause mortality risk to be significantly higher (Noto, Goto, Tsujimoto, & Noda, 2013).

Studies show an association between increased consumption of fruits and vegetables and decreased cancer risk (Aune et al., 2017; Farvid et al., 2016). Fruits and vegetables are thought to be cancer protective (Kunzmann et al., 2016; Vieira et al., 2016; Zhang, Jia, Yan, & Yang, 2017). Consumption of whole grains has also been associated with a reduction in cancer risk (Lei et al., 2016; McRae, 2017; Mourouti et al., 2016; Skeie et al., 2016;). With the strong evidence of fruits, vegetables, and whole grains providing cancer-protective benefits, questions have been raised about the risk of cancer associated with LCHF diets, since these foods are restricted and, in some cases, eliminated (Crowe, 2005). A LCHF diet may increase risk for esophageal cancer (Lagergren, Lindam, & Lagergren, 2013).

A low-carbohydrate diet during pregnancy may influence infant risk of neural tube defects, as folic acid fortification of all American grains and cereals has led to a 30% decrease in spina bifida and ancephaly in the United States (Desrosiers, Siega-Riz, Mosley, & Meyer, 2018). When people restrict carbohydrates, they also may be restricting primary sources of folic acid. One study found women following a low-carbohydrate diet consumed less than half of the folic acid than other women and were at a slightly higher risk for giving birth to an infant with a neural tube defect (Desrosiers et al., 2018).

Intermittent Fasting

Intermittent fasting is a diet pattern characterized by a severe restriction of calories on certain days or hours of the day and a normal calorie intake during the other hours or days (Conley, Le Fevre, Haywood, & Proietto, 2018). There is no one single method of intermittent fasting, as approaches can vary by days or hours fasted and the degree of caloric restriction (Harris, McGarty, Hutchison, Ells, & Hankey, 2017). Number of days fasting can range from alternating fasting and normal consumption days (one day on, one day off), fasting two days and consuming a normal caloric intake for five days (the 5:2 pattern), or fasting for longer cyclic periods (Harris et al., 2017). The 5:2 pattern is thought to be the most popular approach to intermittent fasting (Shaznik-Wikiel & Polotsky, 2014). The fasting period can even be for a set number of hours each day (Corley et al., 2018). The degree of caloric restriction during fasting can vary from partial restriction to complete fasting (Corley et al., 2018).

Intermittent Fasting versus Daily Calorie Restriction. When comparing intermittent fasting to a typical calorie-restricted diet, outcomes are not significantly different enough to recommend one diet over the other (Keogh, Pederson, Peterson, & Clifton, 2014). Twenty-four obese male war veterans were examined, with half of the participants following an intermittent fasting diet pattern and the others following a reduced-calorie diet (Conley et al., 2018). Both intervention groups lost weight and experienced a reduction in waist circumference, but there was no significant difference between the two groups. Although intermittent fasting led to weight loss, there was no notable advantage of intermittent fasting over a reduced-calorie diet (Conley et al., 2018). Another study examined the effects of intermittent fasting compared to a reduced calorie

diet for overweight and obese females by evaluating weight loss and food choices in both groups after 8 weeks and 12 months (Keogh et al., 2014). Weight loss was not significantly different between the two intervention groups for either time frame. However, there was an increase in the Healthy Eating Index score at 12 months for those following a reduced-calorie diet compared to those following intermittent fasting (Keogh et al., 2014). A systematic review and meta-analysis found no significant difference in weight lost from short-term intermittent fasting compared to weight lost from short-term daily calorie reduction (Harris et al., 2017). A review of six small short-term studies compared those following intermittent fasting versus continuous calorie reduction and found no significant difference in weight loss between the two interventions (Harvie & Howell, 2017). An alternate-day fasting diet pattern compared with moderate daily caloric restriction in obese adults resulted in no differences in weight loss, lipid levels, body composition, or insulin sensitivity between the two methods (Catenacci et al., 2016). A study examining effects of intermittent fasting and continuous energy restriction in overweight and obese women found both methods were equally effective for weight loss and reduction in blood pressure, C-reactive protein, triglycerides, leptin, free androgen index, LDL, and total cholesterol (Harvie et al., 2011). Intermittent fasting showed a greater reduction in insulin resistance and fasting insulin (Harvie et al., 2011).

Potential Benefits. Proponents of intermittent fasting claim this pattern leads to changes in metabolic pathways, utilizing ketogenesis, lipolysis, autophagy, and stress resistance (Longo & Mattson, 2014). These metabolic changes can aid in weight loss and help improve blood sugar levels, blood lipids, and blood pressure (Conley et al., 2018). Intermittent fasting may have cardioprotective benefits, demonstrated through improved

LDL and total cholesterol levels and increased circulating adiponectin (Hutchison et al., 2019; Klempel, Kroeger, Bhutani, Trepanowski, & Varady, 2012; Moro et al., 2016; Wan et al., 2010). Some studies have even shown that intermittent fasting may help treat or reduce the risk of cancer (Hooper, 2014; Lee et al., 2012; Schloss & Steel, 2016).

The effects of intermittent fasting on overweight and obese women have been explored; this dietary pattern was effective for weight loss and even improved metabolic biomarkers, including insulin resistance (Harvie et al., 2011). Another study examined the effects of alternate-day fasting compared to ad libitum eating in 32 normal weight and overweight adults (Varady et al., 2013). After 12 weeks, subjects who followed an alternate-day fasting regimen experienced moderate weight loss, decreased fat mass, and improvements in triacylglycerols, CRP, leptin, LDL, and adiponectin levels (Varady et al., 2013). An examination of the effects of alternate-day fasting in 15 overweight and obese women found this dietary pattern led to a reduction in body weight, waist circumference, and blood pressure (Eshghinia & Mohammadzadeh, 2013).

Though Eshghinia and Mohammadzadeh (2013), Harvie et al. (2011), and Varady et al. (2013) have shown potential health benefits associated with intermittent fasting, there is not enough evidence to support the benefits, as this area is still under-researched, especially in relation to long-term effects (Harris et al., 2017). Much of the research conducted in this area lack rigor in design, which poses a challenge when trying to interpret current evidence available (Shaznik-Wikiel & Polotsky, 2014).

Side Effects and Risks. Studies exploring the effects of similar fasting patterns during the Dutch famine observed early onset of menopause, higher rates of osteoporosis, and irregular menstruation in those who fasted (Shaznik-Wikiel & Polotsky, 2014).

Long-term alternate-day fasting led to diastolic dysfunction, myocardial hypertrophy, cardiac fibrosis, and reduced cardiac reserve in rats (Ahmet, Wan, Mattson, Lakatta, & Talan, 2010). Intermittent fasting patterns have been shown to produce heightened stress symptoms, including increased cortisol, parasympathetic withdrawal, and activation of the sympathetic nervous system (Bahijri et al., 2013; Mazurak et al., 2013). A study conducted on young, physically active men participating in Ramadan fasting found sleep quality improved after Ramadan fasting in comparison to during the fasting period (Hsouna et al., 2019). These findings could suggest a potential risk for abnormal or inadequate sleep patterns during intermittent fasting (Hsouna et al., 2019).

Intermittent fasting, when studied in those with Type 2 diabetes, was associated with an increase in frequency of hypoglycemia (Corley et al., 2018). The hypoglycemic episodes were not severe, but participants in the study received weekly supervision, education on hypoglycemia, and medication adjustments to account for lower blood sugar levels (Corley et al., 2018). A comparison of intermittent fasting with daily calorie restriction in rats found short-term intermittent fasting (four weeks) demonstrated favorable results regarding glucose tolerance, but long-term intermittent fasting (eight months) promoted glucose intolerance and hyperglycemia after feeding (Cerqueira et al., 2011). Another study conducted on mice compared 20 subjects on an intermittent fasting dietary regimen with 10 fed ad-libitum (Kliewer et al., 2015). Those on an intermittent fasting regimen were more likely to engage in gorging behaviors when they were fed. During weight regain, they experienced enhanced intra-abdominal fat accumulation and a reduction in insulin sensitivity compared to ad-libitum fed mice (Kliewer et al., 2015). More research on the effects of intermittent fasting in mice found this diet pattern led to

elevated levels of glycemia, insulinemia, insulin resistance, and glucose intolerance (Dorighello et al., 2014). Intermittent fasting could potentially pose a risk for those with Type 2 diabetes, especially if it is done without medical supervision, education, and routine medication adjustments (Bonakdaran & Khajeh-Dalouie, 2011). An observation of adults with Type 2 diabetes who participate in Ramadan fasting showed while there was a reduction in hyperglycemic events during this season, there was also a significant increase in the prevalence of hypoglycemic events, especially in those taking sulfonylureas or on insulin therapy (Bonakdaran & Khajeh-Dalouie, 2011). A cross-sectional observational study conducted in several countries observed the effects of Ramadan in patients with diabetes and found 16.8% of respondents reported experiencing hypoglycemia during fasting; rates of hypoglycemia were higher in subjects with type 1 diabetes and those who followed an insulin regimen (Beshyah et al., 2019). During Ramadan fasting, patients with diabetes are advised to adjust their medication dosages and timing to accommodate changes in eating patterns, as this type of fasting can put those with diabetes at an increased risk of hypoglycemia (Farid, Rosenburg, & Bartlett, 2014). Other potential risks for persons with diabetes participating in intermittent fasting patterns include dehydration, hyperglycemia, and diabetic ketoacidosis (Farid et al., 2014).

Intermittent fasting may affect athletic performance as seen in studies conducted with athletes who practice Ramadan (Chtourou et al., 2011; Singh et al., 2011). One study assessed the effects of Ramadan fasting on perceived exertion and mood state of young soccer players (Chtourou et al., 2011). Those who fasted during Ramadan experienced greater muscle fatigue during performance tests and also reported higher

perceived fatigue and exertion scores on questionnaires (Chtourou et al., 2011). Teen athletes were surveyed during Ramadan and 29.3% thought fasting negatively influenced the quality of their training, 24% reported adverse effects from fasting during athletic performances, and 66.6% complained of feeling sleepy during the day (Singh et al., 2011). One study compared athletic performance of resistance-trained men who consumed breakfast with resistance-trained men who omitted breakfast 2 hours before practicing back squats and bench presses. Subjects who skipped breakfast completed less repetitions compared to subjects who ate breakfast, which indicates a possibility of impaired performance in those who fast before exercising (Bin Naharudin et al., 2019).

Detoxes and Cleanses

A number of different detoxification and cleansing diets are advertised and practiced in the diet industry (Mullin, 2010). Proponents assert these diets remove toxins or impurities from the body, which supposedly leads to a revival of organ and biochemical function (Mullin, 2010). Detox diets claim to aid in weight loss and promotion of health and well-being (Klein & Kiat, 2015). There are several different methods of detoxification, including complete starvation, juice fasts, and food modifications. Detox diets that include consumption of foods, beverages, herbs, or supplements often depend on laxatives, vitamins, minerals, diuretics, or foods that are said to “cleanse” the body (Klein & Kiat, 2015). These diets are often recommended by alternative practitioners, naturopathic doctors, and neutraceutical firms (Mullin, 2010). The term “toxin” referenced in these diets is often a very vague term with little to no explanation, but practitioners often include heavy metals, synthetic chemicals, processed foods, environmental pollutants, and “other potentially harmful products” under this

umbrella term (Klein & Kiat, 2015). When a detox diet is recommended, an explanation of the specific toxin targeted or the physiology of the detox process is rarely provided, which makes investigation of claims difficult to accomplish (Klein & Kiat, 2015). Research on the efficacy and safety of detox diets, especially with large, well-designed, unbiased clinical trials, is lacking (Mullin, 2010). Investigation into the accuracy of claims that detox diets aid in weight loss, liver detoxification, and pollutant elimination has been minimal and the studies that have been carried out were flawed or had very small sample sizes (Klein & Kiat, 2015).

There are a few case reports with clinical outcomes from various detox and cleansing methods available in the literature (Keum et al., 2010; Mishouri, Otubu, & Jones, 2011; Sanchez et al., 2012). A 60-year-old Korean woman was admitted to the hospital with severe anal pain and had experienced bleeding for four days after receiving a coffee enema to treat chronic constipation (Keum et al., 2010). After further examination, the patient had proctocolitis and severe ulcers in her colon as a result of using a coffee enema as an alternative therapy (Keum et al., 2010). A 49-year-old man visited the hospital for abdominal pain, vomiting, and diarrhea after using a colon cleanser four days earlier (Mishouri et al., 2011). The attending gastroenterologist diagnosed the patient with herbal intoxication (Mishouri et al., 2011). A 50-year-old man visited the emergency department with complaints of abdominal pain, muscle weakness, vomiting, dizziness, and diarrhea after consuming Epsom salts for a liver cleansing diet (Sanchez et al., 2012). Despite being admitted to the intensive care unit and receiving rapid rehydration via an intravenous solution, the patient progressed to liver failure and suffered from acute renal injury, coagulopathy, myocardial dysfunction, acute respiratory

distress, and shock. The patient's condition continued to worsen and he died after 72 hours of intensive treatment. The forensic autopsy revealed the cause of death was acute intoxication from ingestion of Epsom salts (Sanchez et al., 2012).

Aside from the limited research on these diets, it is important to note the human body performs detoxification on its own with the help of the kidneys, liver, gastrointestinal system, lungs, and skin (Klein & Kiat, 2015). Some toxic substances are more difficult to remove from the body, but there is no evidence to support the assertion that detox diets remove these substances from the body (Klein & Kiat, 2015). Cleansing products can contain various herbs, enzymes, or laxatives that may be contraindicated and produce unwanted side effects such as electrolyte abnormalities, vomiting, dehydration, pancreatitis, bowel perforation, infection, acute kidney insufficiency, and heart failure (Mishouri et al., 2011). Detox diets with extreme fasting can lead to nutrient deficiencies, lactic acidosis, electrolyte imbalance, and even death (Klein & Kiat, 2015). Adverse effects of detox and cleansing diets can be clinically severe. Side effects can vary from person to person and by the regimen followed (Keum et al., 2010; Klein & Kiat, 2015; Mishouri et al., 2011; Mullin, 2010; Sanchez et al., 2012).

Summary

In summary, the CES has long been known for delivering research-based information to the public, with the help of well-educated extension agents who keep current on emerging research and seek professional development and educational opportunities (Gornish et al., 2018). There is a plethora of diet and nutrition information available to the public, making it easy for nutrition misinformation to be readily accessed

(Hornick et al, 2013). FCS agents are vital to providing scientific research-based nutrition information in the communities they serve (Horacio Atiles & Eubanks, 2014). Some of the more popular fad diets today include low carbohydrate diets, intermittent fasting, detoxes, and cleanses (Hooper, 2014; Joshi & Mohan, 2018; Katz & Meller, 2014; Mullin, 2010). These diets lack substantial research to prove their safety and effectiveness, which makes discussion of these fads an important component of educating communities about proper nutrition (Cason & Haines, 2002; Hooper, 2014; Horacio Atiles & Eubanks, 2014; Katz & Meller, 2014; Mullin, 2010).

CHAPTER 3

METHODS

The purpose of this study was to assess FCS agents' knowledge of popular fad diets (low carbohydrate, intermittent fasting, detoxes and cleanses) and their potential adverse effects in relation to the state agents work in, certifications held, years of experience, membership in professional associations, and education level. An online survey design was used to assess knowledge, factors influencing knowledge, resources used to enhance their knowledge, and to identify knowledge gaps. A letter of support was obtained from each state's CES office. The letters of support, along with the data collection instrument, were submitted to the Louisiana Tech Human Use Committee (HUC). Approval from the HUC was obtained before data collection began. HUC approval is in Appendix B-1 and state office letters of support are in Appendix B-2.

Participants

Participants eligible for this study included FCS agents employed in CES in Louisiana, Texas, Mississippi, and Arkansas. A designated person from the state office of each participating state was asked to send a link to the online survey to agents who fit the inclusion criteria. These were those who worked in FCS, health, nutrition, and related fields. Agents who completed the survey were provided directions to enter into a voluntary raffle for a $25 Amazon gift card upon completion of the survey. The target

study sample size was 80-100 agents. There was 183 total responses. Two participants indicated they did not practice nutrition education and were excluded from the survey. Participants who did not complete at least 90% of the survey were excluded from statistical analysis. Other responses excluded were for data input and analysis purposes and are explained in further detail in Chapters four and five. The final sample size was 138 respondents.

Data Collection Instrument

The data collection instrument used for this study was an online survey designed by the researcher, and administered through Survey Monkey™, a survey development website. State office personnel sent an email to eligible agents, providing a link to the survey and requesting participation. To ensure confidentiality, the survey was completed in private on a computer in a location chosen by the participant. There was no identifier assigned to each participant, meaning all respondents anonymously completed the survey. All information was stored in Survey Monkey™. The survey collected demographic information including participants' geographical state of employment, professional certifications held, years of experience in extension, membership in professional associations, and education level. The survey tool assessed participants' knowledge of the premises and potential adverse effects of low-carbohydrate diets, intermittent fasting, detoxes, and cleanses. The survey was pilot tested on four adults who were not employed in CES to check for potential errors in the online format. After pilot testing was completed, the survey was revised and finalized.

Data Collection Procedure

State office representatives were provided a general email message and a link to the survey, which they were asked to send to their FCS agents. The general email message given to state office representatives is located in Appendix B-3. The HUC Approval for the general email message can be found in Appendix B-1. Agents were given four weeks to complete the survey from the date it was sent to them. State office representatives were asked to send a reminder email to their agents within the week before the end date. The survey instrument is in Appendix A-1 and the answer key is in Appendix A-2. Once agents completed the survey, instructions were given to be entered into a raffle to win a $25 Amazon gift card by texting "bulldogs" to the researcher. Participation in the raffle was completely voluntary, which was specified in the instructions. The winner of the raffle was chosen at random, contacted through text message, and was sent the gift card via email.

Data Analysis

The Statistical Package for the Social Sciences (SPSS) Version 25 for Students and Stata were used for statistical analysis. Frequency testing was used for descriptive statistical analysis of demographic data. Respondents' knowledge about the premises and potential adverse effects of low-carbohydrate diets, intermittent fasting, detoxes and cleanses was assessed with a numerical test score from survey answers. Knowledge was scored for six different categories (knowledge of low-carbohydrate diets, knowledge of intermittent fasting, knowledge of detoxes/cleanses, knowledge of potential adverse

effects of low-carbohydrate diets, knowledge of potential adverse effects of intermittent fasting, and knowledge of potential adverse effects of detoxes/cleanses). Scores for knowledge of low-carbohydrate diets, intermittent fasting, detoxes and cleanses were averaged, as were scores for potential adverse effects of low-carbohydrate diets, intermittent fasting, detoxes and cleanses. ANOVA was used to compare both score categories with education level, years of experience, membership in professional associations, certifications held, and the state in which participants were employed. The scoring tool is in Appendix A-3.

CHAPTER 4

RESULTS

Demographic Data

One hundred eighty-three FCS agents from Louisiana, Texas, Arkansas, and Mississippi responded to the online survey. Of the 183 responses, 138 were used for statistical analysis. Respondents who stated they did not practice nutrition education and those who did not complete 90% or more of the survey were excluded from statistical analysis. Most agents reported general nutrition (93%) and food safety (62%) as their areas of practice. The most frequently reported length of employment was between one and ten years (42%). More importantly, 38% of agents reported they had more than ten years of experience, which reveals CES touts an experienced workforce. Education levels varied, but most respondents reported they had earned a master's degree (63%). Over half of the respondents reported Texas as their state of employment (51%). Most respondents were females (96%). Respondent demographics can be seen in Table 2.

Table 2.

Respondent Demographics (*n* = 138)

Variable	Respondents *n* (%)
Area of practice	
General Nutrition	128 (93%)
Food Safety	86 (62%)
Weight Control	54 (39%)
Diabetes Management	60 (44%)
EFNEP	20 (15%)
Years of experience	
0-1 year	27 (20%)
>1 year - ≤ 10 years	58 (42%)
> 10 years - ≤ 20 years	31 (22%)
> 20 years	22 (16%)
Education level	
Bachelor's	26 (19%)
Some graduate studies	15 (11%)
Master's	87 (63%)
Doctorate	10 (7%)
State of employment	
Louisiana	15 (11%)
Texas	70 (51%)
Arkansas	36 (26%)
Mississippi	17 (12%)
Gender	
Male	4 (3%)
Female	133 (96%)
Other/I prefer not to disclose	1 (1%)

Note: Respondents may have chosen more than one area of practice. EFNEP = Expanded Food and Nutrition Education Program.

A variety of professional association memberships were seen among respondents. A majority of respondents (80%) were members of NEAFCS. There were seventeen respondents (12%) who were members of AND. All professional association memberships are listed in Table 3.

Table 3.

Professional Association Memberships Among Survey Respondents

Professional Association	Respondents *n* (%)
National Extension Association of Family and Consumer Sciences (NEAFCS)	111 (80%)
Academy of Nutrition and Dietetics (AND)	17 (12%)
Society for Nutrition Education and Behavior (SNEB)	2 (2%)
Other	26 (19%)
One other professional association	20 (15%)
Multiple other professional associations	6 (4%)

Note: Professional association memberships are listed in descending order of frequency. Respondents may hold more than one membership.

Members of SNEB and AND scored higher for total knowledge scores (72%) than NEAFCS (70%) members. The highest sub-category score among the professional association memberships was seen in SNEB members for intermittent fasting knowledge (100%). The lowest sub-category knowledge score among professional association memberships was seen in SNEB members for knowledge of adverse effects for intermittent fasting (57%). Knowledge scores for sub-categories among professional association memberships can be seen in Table 4.

Table 4.

Knowledge Scores Among Professional Association Memberships

Knowledge Subcategory	NEAFCS	SNEB	AND
Low-Carbohydrate Knowledge	74%	74%	81%
Intermittent Fasting Knowledge	78%	100%	80%
Detox and Cleanse Knowledge	73%	76%	77%
Low-Carbohydrate Adverse Effects Knowledge	61%	69%	69%
Intermittent Fasting Adverse Effects Knowledge	64%	57%	62%
Detox and Cleanse Adverse Effects Knowledge	68%	63%	68%
Total Knowledge Score	70%	72%	72%

Note: The percentages represent the average scores among respondents who hold the professional association memberships in the table.

Professional certifications among agents greatly varied. The most frequently reported certification was Extension Specialist (15%). There were thirteen (9%) Registered Dietitian Nutritionists and Dietetic Technicians in the sample. Though the survey asked respondents if they held the Master Certified Health Education Specialist (MCHES) certification, none reported this certification as one they held. Table 5 lists all certifications of survey respondents.

Table 5.

Certifications of Survey Respondents

Certification	Respondents *n* (%)
Extension Specialist	20 (15%)
Certified in Family and Consumer Sciences (CFCS)	14 (10%)
Registered Dietitian Nutritionist (RDN) and/or Dietetic Technician, Registered (DTR)	13 (9%)
Certified Health Coach (CHC)	4 (3%)
Certified Health Education Specialist (CHES)	3 (2%)
Other	42 (30%)
One other certification	34 (25%)
Multiple other certifications	8 (6%)

Note: Certifications are listed in descending order of frequency. Respondents may hold more than one certification.

The RDN and DTR, CHES, and CHC certifications scored higher for total knowledge scores (74%). The highest scoring sub-category among the certifications held was seen in the CHES certification for detox and cleanse knowledge (84%). The lowest scoring sub-category among the certifications held was seen in the CFCS certification for knowledge of adverse effects for low-carbohydrate diets (62%). Knowledge scores for sub-categories among professional certifications can be seen in Table 6.

Table 6.

Knowledge Scores Among Professional Certifications Held

Knowledge Subcategory	Extension Specialist	RDN and DTR	CHES	CHC	CFCS
Low-Carbohydrate Knowledge	72%	83%	67%	86%	67%
Intermittent Fasting Knowledge	77%	80%	83%	71%	78%
Detox and Cleanse Knowledge	75%	76%	84%	78%	77%
Low-Carbohydrate Adverse Effects Knowledge	56%	73%	64%	73%	62%
Intermittent Fasting Adverse Effects Knowledge	63%	65%	71%	61%	64%
Detox and Cleanse Adverse Effects Knowledge	69%	71%	75%	80%	69%
Total Knowledge Score	69%	74%	74%	74%	70%

Note: The percentages represent the average scores among respondents who hold the professional certifications in the table.

Knowledge of Fad Diets

The average total score for knowledge of fad diets and their potential adverse effects among all respondents was 70%, which was calculated using the simple mean of the scores for knowledge and adverse effects. The total average was lower than the average score for knowledge of fad diets (75%), which indicates respondents scored higher on questions regarding knowledge compared to questions regarding adverse effects. The highest average knowledge score from the three fad diets examined was intermittent fasting.

The average score for knowledge of low-carbohydrate diet questions was 73%, which was the lowest knowledge score among the three fad diets examined. Respondents scored highest when asked if bread contained carbohydrates (99%) and lowest when asked the percentage of carbohydrates that low-carbohydrate diets entailed (14%). The second lowest scoring question for this category was when respondents were asked if the Zone Diet was a low-carbohydrate diet (20%). Scores for questions pertaining to knowledge of low-carbohydrate diets can be seen in Table 7.

Table 7.

Knowledge Scores for Low-Carbohydrate Diets

Question	Percentage of correct responses (%)
Which of the following foods contain carbohydrates? Check all boxes that apply.	
Black coffee	97%
Canola oil	90%
Bread	99%
Fruit	94%
Butter	78%
Wine	73%
Honey	78%
Tuna	91%
Kidney beans	87%
Low-carbohydrate diets entail a total carbohydrate intake of less than _____of your total daily calorie intake.	14%
Most low-carbohydrate diets replace carbohydrates with _____.	27%
Which of the following are low-carbohydrate diets?	
Weight Watchers	75%
Zone Diet	20%
Ideal Protein	38%
Ketogenic Diet	94%
Vegetarian Diet	86%
South Beach Diet	61%
Atkins Diet	94%
MyPlate	97%
Average Low-Carbohydrate Diet Knowledge Score	73%

Note: Percentages reflect average scores among all survey respondents included in statistical analysis.

The average score for knowledge of intermittent fasting questions was 78%. Respondents scored highest when asked if intermittent fasting included eating a balanced diet with three meals each day (96%) and avoiding dairy four days of the week (96%). Respondents scored lowest when asked what the most popular form of intermittent fasting was (51%). Scores for questions pertaining to knowledge of intermittent fasting can be seen in Table 8.

Table 8.

Knowledge Scores for Intermittent Fasting

Question	Percentage of correct responses %
What is intermittent fasting?	81%
Which of the following are types of intermittent fasting? Check all that apply.	
Skipping certain meals	77%
Eating a balanced diet with 3 meals each day	96%
Eliminating red meats 3 days of the week	94%
Fasting 2 days of the week	77%
Restricting carbohydrates during high-stress events	92%
Fasting alternate days of the week	81%
Fasting during exercise	83%
Restricting dairy during the day if your blood type is AB	96%
Eating at night and fasting during the day	57%
Severely restricting calories 2 days of the week	52%
Avoiding dairy 4 days of the week	96%
What is said to be the most popular method of intermittent fasting?	51%
When comparing weight loss from intermittent fasting with weight loss from moderate daily calorie restriction, intermittent fasting is:	62%
Average Intermittent Fasting Knowledge Score	78%

Note: Percentages reflect average scores among all survey respondents included in statistical analysis.

The average knowledge score for detoxes and cleanses was 74%. Respondents scored highest when asked if MyPlate was a method used in detoxes and cleanses (99%). The second highest scoring question was when respondents were asked if a balanced diet was a method used in detoxes and cleanses (97%). The lowest score seen was when respondents were asked if food modifications were a method used in detoxes and cleanses (25%). Scores pertaining to knowledge of detoxes and cleanses can be seen in Table 9.

Table 9.

Knowledge Scores for Detoxes and Cleanses

Question	Percentage of correct responses (%)
True or False? Detoxes and cleanse diets remove toxins and impurities from the body, which revives your organs and biochemical function.	65%
The term "toxin," when referenced in detox and cleanse diets, includes which of the following?	
Processed foods	77%
Herbal medicines	95%
Heavy metals	62%
Carbohydrates	86%
Synthetic chemicals	87%
Caffeine	60%
Water	95%
Environmental pollutants	64%
"Other potentially harmful products"	76%
The majority of weight lost during a detox or cleanse is:	82%
Which of the following methods are used in detoxes and cleanses? Check all that apply.	
Complete starvation	25%
Use of laxatives	73%
A balanced diet	97%
Juice fasts	84%
Food modifications	25%
Smaller portions	86%
Focus on specific vitamins and minerals	25%
Use of diuretics	70%
MyPlate	99%
Use of foods that "cleanse" the body	83%
Side effects seen in detoxes and cleanses:	87%
Side effects experienced by those doing detoxes and cleanses:	96%
Average Detox/Cleanse Diet Knowledge Score	74%

Note: Percentages reflect average scores among all survey respondents included in statistical analysis.

ANOVA testing was used to determine the factors that influenced respondents' knowledge of fad diets. Knowledge scores were calculated by a simple average of points for correct answers to knowledge-related questions. The calculated knowledge scores served as the dependent variable for ANOVA testing. Potential factors influencing knowledge, including years of work experience in CES, membership in professional associations, education level, and certifications held, served as the independent variables. Significance was interpreted with resulting *p*-values from the statistical analysis. A *p*-value of ≤ 0.05 indicated significance. There were no *p*-values for knowledge scores that indicated significance. The results from the ANOVA test are listed in Table 10.

Table 10.

ANOVA Results for Fad Diet Knowledge Scores

Variable	*F* value	*p*-value
Area of practice		
General Nutrition	0.005	0.94
Food Safety	0.03	0.85
Weight Control	0.52	0.47
Diabetes Management	0.22	0.64
EFNEP	0.01	0.92
Years of experience	0.05	0.98
Membership in professional organizations		
NEAFCS	1.6	0.21
SNEB	0.45	0.50
AND	1.58	0.21
Education level	0.23	0.88
Certifications Held		
Extension Specialist	0.03	0.9
RDN and DTR	0.27	0.60
CHES	0.93	0.34
CHC	0.57	0.45
CFCS	0.15	0.70

Note: *$p \leq 0.05$

Knowledge of Adverse Effects of Fad Diets

The average score for overall knowledge of adverse effects of fad diets was 65%. Respondents scored lower on questions pertaining to adverse effects in comparison to questions related to knowledge of fad diets. The highest average score for adverse effects from the three fad diets examined was detoxes and cleanses.

The average score for adverse effects of low-carbohydrate diets was 62%, which was the lowest score of all six categories analyzed. Respondents scored highest when asked if low-carbohydrate diets could cause dysgeusia (91%) and if low-carbohydrate diets decreased mortality risk (91%). Respondents scored lowest when asked if low-carbohydrate diets could increase risk for esophageal cancer (6%). The second lowest scoring question was whether low-carbohydrate diets could cause increased mortality risk (23%). Scores pertaining to respondents' knowledge of adverse effects of low-carbohydrate diets can be found in Table 11.

Table 11.

Knowledge Scores for Adverse Effects of Low-Carbohydrate Diets

Question	Percentage of correct responses %
Low carbohydrate diets are often high in _____, which leads to ____.	50%
In women who are pregnant or planning to become pregnant, a low-carbohydrate diet may increase the likelihood of:	35%
One of the major changes in cardiovascular markers seen in those who follow a low-carbohydrate diet, which increases risk for heart issues, is:	52%
Low carbohydrate diets may have which of the following effects? Check all that apply.	
Increased blood calcium levels	88%
Increased LDL cholesterol levels	65%
Halitosis	38%
Fatigue	73%
Hyperthermia	87%
Increased risk for esophageal cancer	6%
Decreased mortality risk	91%
Increased mortality risk	23%
Reversal of diabetes (Type 1)	83%
Dysgeusia	91%
Average Low-Carbohydrate Adverse Effects Knowledge Score	62%

Note: Percentages reflect average scores among all survey respondents included in statistical analysis.

The average score for adverse effects of intermittent fasting was 64%. Respondents scored highest when asked if intermittent fasting could lead to improved nerve function in persons with Type 2 diabetes (98%). Respondents scored lowest when asked if early onset of menopause was an adverse effect seen in intermittent fasting (17%). Scores pertaining to respondents' knowledge of adverse effects of intermittent fasting can be found in Table 12.

Table 12.

Knowledge Scores for Adverse Effects of Intermittent Fasting

Question	Percentage of correct responses %
Which of the following effects have been seen as a result of intermittent fasting? Check all that apply.	
Reversal of the effects of aging	93%
Increased susceptibility to bowel polyps	80%
Increased risk of osteoporosis	31%
Blockage of carcinogens in the body	93%
Early onset of menopause	17%
Irregular menstruation	56%
Heightened stress	53%
Increased incidence of dystonia	62%
Dry mouth	58%
Night sweats	80%
Intermittent fasting may cause which of the following for those with Type 2 diabetes? Check all that apply.	
Insulin resistance	33%
Retinopathy	91%
Decreased insulin resistance	78%
Hypoglycemia	62%
Hyperglycemia	22%
Increased fat burning	87%
Diabetic ketoacidosis	57%
Dehydration	49%
Improved nerve function	98%
Lipohypertrophy	91%
Intermittent fasting may cause _____ in athletes.	45%
Average Intermittent Fasting Adverse Effects Knowledge Score	64%

Note: Percentages reflect average scores among all survey respondents included in statistical analysis.

The average score for adverse effects of detoxes and cleanses was 69%, which was the highest adverse effects score among the three fad diets examined. Respondents scored highest when asked if warts could be a consequence of detoxes and cleanses (100%). Respondents scored lowest when asked if pancreatitis could be a consequence of detoxes and cleanses (15%). Scores pertaining to respondents' knowledge of adverse effects of detoxes and cleanses can be found in Table 13.

Table 13.

Knowledge Scores for Adverse Effects of Detoxes and Cleanses

Question	Percentage of correct responses %
Which of the following can be consequences of detoxes and cleanses?	
Nutrient deficiencies	92%
Edema	73%
Infertility	80%
Acne	77%
Warts	100%
Electrolyte abnormalities	73%
Dehydration	86%
Norovirus	98%
Pancreatitis	15%
Lactic acidosis	22%
Gum disease	92%
Atrial septal defect	98%
Vomiting	28%
Hemophilia	97%
Heart failure	16%
Acute kidney insufficiency	46%
Average Detox/Cleanse Adverse Effects Knowledge Score	69%

Note: Percentages reflect average scores among all survey respondents included in statistical analysis.

ANOVA testing was used to determine significant differences between factors that may influence scores for knowledge of adverse effects. Knowledge scores of potential adverse effects of fad diets were calculated using a simple mean of the points assigned to answers related to adverse effects. The calculated adverse effects scores served as the dependent variable for ANOVA testing. Potential factors influencing knowledge of adverse effects, including years of work experience in CES, membership in professional associations, education level, and certifications held, served as the independent variables. *P*-values determined significance, with a significance value of $p \leq 0.05$. Results from the ANOVA test are listed in Table 14.

Table 14.

ANOVA Results for Adverse Effects Knowledge Scores

Variable	*F* value	*p*-value
Area of practice		
General Nutrition	0.05	0.83
Food Safety	2.52	0.12
Weight Control	0.16	0.69
Diabetes Management	0.93	0.34
EFNEP	0.22	0.64
Years of experience	0.61	0.61
Membership in professional organizations		
NEAFCS	0.2	0.66
SNEB	0.61	0.44
AND	0.42	0.52
Education level	0.32	0.81
Certifications Held		
Extension Specialist	0.09	0.77
RDN and DTR	4.83*	0.03
DTR	3.9	0.06
CHES	5.16*	0.03
CHC	0.05	0.82
CFCS	0.31	0.58

Note: *$p \leq 0.05$

Two *p*-values from univariate ANOVA testing for knowledge of adverse effects were found to be significant. There was a significant main effect for the Certified Health Education Specialist (CHES) certification, $F = 5.16$, $p = 0.03$. There was also a significant main effect for the Registered Dietitian (RDN) and Dietetic Technician (DTR) certifications, $F = 4.83$, $p = 0.03$.

When tested using univariate ANOVA and Tukey's Post Hoc Test, one significant difference was found in the knowledge of adverse effects scores among the participating tests. Comparison of scores between Louisiana and Mississippi found a significant main effect, $p = 0.02$. Respondents from Louisiana scored significantly higher than respondents from Mississippi in regard to knowledge of adverse effects of popular fad diets. This could suggest that Louisiana agents had more knowledge about the adverse effects of fad diets in comparison to Mississippi agents. Table 15 shows the results of the Tukey's Post Hoc test.

Table 15.

Tukey's Post Hoc Test Results for Knowledge of Adverse Effects Scores Related to Geographical State of Employment

(*I*) State employed in	(*J*) State employed in	Mean Difference (*I-J*)	Significance (*p*)
Louisiana	Texas	4%	0.35
	Arkansas	4%	0.32
	Mississippi	8%*	0.02
Texas	Louisiana	-4%	0.35
	Arkansas	0%	0.99
	Mississippi	5%	0.13
Arkansas	Louisiana	-4%	0.32
	Texas	0%	0.99
	Mississippi	4%	0.26
Mississippi	Louisiana	-8%*	0.02
	Texas	-5%	0.13
	Arkansas	-4%	0.26

Note: *$p \leq 0.05$

Information Sources Utilized

Information sources most utilized by respondents to obtain information about fad diets included .edu websites (74%), .gov websites (65%), and conference sessions (57%). Table 16 shows the information sources respondents used to obtain information about fad diets.

Table 16.

Information Sources Used by Respondents

Information source	Percentage of respondents (%)
.edu websites	74%
.gov websites	65%
Conference sessions	57%
Webinars	57%
Journal articles	54%
Statewide trainings	52%
Information shared by colleagues	41%
.org websites	41%
Social media	29%
Magazines	19%
Personal testimonials	17%
.com websites	12%
Textbooks	10%
Other	7%
Wikipedia	3%
.net websites	3%
I've never received information about fad diets	1%

Note: Information sources are listed in descending order of frequency utilized.

CHAPTER 5

DISCUSSION AND CONCLUSION

The quality of programming and educational opportunities available through extension is heavily dependent on the knowledge and skills of the professionals delivering them (Cummings, Andrews, Weber, & Postert, 2015). Consistent professional development and the mindset of a lifelong learner are critical components of successful cooperative extension agents.

The study's results suggest a favorable association between certified health education specialists (CHES), registered dietitians (RDNs), and dietetic technicians (DTRs) in the field of cooperative extension and their knowledge of adverse effects of popular fad diets. Three respondents in the sample had the CHES certification. Those who hold the CHES certification are skilled in all aspects of health education programming, from assessment of community needs to evaluation and serving as a resource for other professionals (Barnes, Neiger, Mondragon, Hanks, & Brandon, 2002). There were thirteen RDNs and DTRs in the sample. RDNs and DTRs are trained in dietetics practice and food and nutrition sciences (The Academy Quality Management Committee, 2018). Among the thirteen RDNs and DTRs in the study, twelve respondents (92%) worked in the area of general nutrition. Of the respondents who were RDNs and DTRs, 46% had one or less years of experience in cooperative extension, while 23% had up to ten years of experience, and 31% had up to twenty years of experience. None of

these respondents reported having more than twenty years of experience in cooperative extension. This may suggest that RDNs and DTRs, regardless of their years of experience in cooperative extension, have greater knowledge regarding the adverse effects of fad diets. Of the thirteen RDNs and DTRs surveyed, a majority of them (85%) were members of the Academy of Nutrition and Dietetics. The Academy of Nutrition and Dietetics (AND) is the largest dietetics association in the world, serving to build and grow dietetic professionals through educational resources and professional development opportunities (Stein, 2017). AND has demonstrated commitment to providing high-quality, objective, research-based information, as evidenced by their scientific integrity principles (Tappenden, 2015). AND's research-based continuing education opportunities tend to be a strong motivator for registered dietitians to hold membership in the association, as they are required to complete continuing education hours to maintain the registered dietitian credential.

While having CHES, RDN, and DTR certifications was shown to influence knowledge regarding adverse effects popular fad diets, the same did not hold true for general knowledge of the diets. It would be interesting to investigate reasons why these certifications resulted in enhanced knowledge of adverse effects, but not of general fad diet knowledge. Examination of the knowledge of all CHES, RDN, and DTR professionals regarding these diets and their potential adverse effects would help to determine if the findings reflected an association-wide trend as well.

Results indicated agents tended to obtain information from computer-based sources, including .edu websites and .gov websites. While this trend of seeking health information online resembles preferences of the general public, agents in the study often

chose more reliable online sources, while the general public more commonly chooses less reliable sources like commercial websites (LaValley, Kiviniemi, & Gage-Bouchard, 2016). In fact, research shows the general public often does not question reliability or quality of online health information and uses unaccredited information to answer their health questions (Diviani, Putte, Meppelink, & Van Weert, 2016; Quinn, Bond, & Nugent, 2017). It is no surprise that CES agents obtain their nutrition information from reliable online sources, as they are expected to provide their communities with reliable, research-based information. This strength among the FCS agents surveyed could be advantageous in helping influence the online health literacy of the communities they serve.

Results of the knowledge scores identify the areas of adverse effects of fad diets and the relative effectiveness of the various diets as CES agents weakest knowledge scores. These areas should be targeted for future trainings.

Strengths of this study include the sample size and the evaluation of agents from several states. One hundred eighty-three agents were included in the data analysis, which was a larger sample than expected. These agents were employed in Louisiana and its three bordering states. Respondents had a variety of education levels, certifications, years of experience in CES, areas of practice, and professional association memberships, which provided a diverse dataset. Another strength was the amount of information gathered by the survey. The online survey assessed numerous factors and demographic information that could influence knowledge. The convenience of the online survey format was also a strength of the study. Agents from four different states were able to participate in the study since the survey could be accessed from their work computers. Overall, the survey

showed a knowledge deficit among agents regarding fad diets and the adverse effects associated with them, as the average score among all respondents was 70%. This data indicates a need for professional development among FCS agents regarding fad diets. Participating state offices can use the information from this study to develop statewide trainings and resources for their agents. Information was also obtained about agents' preferred learning methods, which will be helpful in developing trainings and resources that fit agents' needs.

While there were factors that strengthened this study, there were also several limitations. Response rates varied among participating states, as some states had greater participation than others. Due to the varying response rates and no state having a 100% response rate from each county or parish, participating states' respondents may not be representative of their entire group of agents. Differences in each state's number of FCS agents could explain the variation in response rates. For example, Louisiana had 15 of their 34 FCS agents respond to the survey (44% response rate), while 70 agents out of 297 FCS staff from Texas responded to the survey (23.6% response rate). It was unknown if two of the state offices (Louisiana and Mississippi) sent their agents a reminder email during the last week of the data collection period, so this may have influenced the response rates among these states. The sample of agents studied is also not representative of the entire nation's population of FCS agents, so further research would be needed to assume the results of this study reflect a national trend.

A limitation to the study is the exclusion criteria of respondents. Of the respondents, thirty-nine were excluded because they did not complete the survey in its entirety. The length of the survey could have been the cause of these incomplete

responses and may have discouraged some agents from completing it, due to the time burden, as FCS agents are known to have very busy schedules. Perhaps respondents found the questions to be not only time consuming, but difficult, or overwhelming. Figure 1 shows the reasons for exclusion of respondents from statistical analysis.

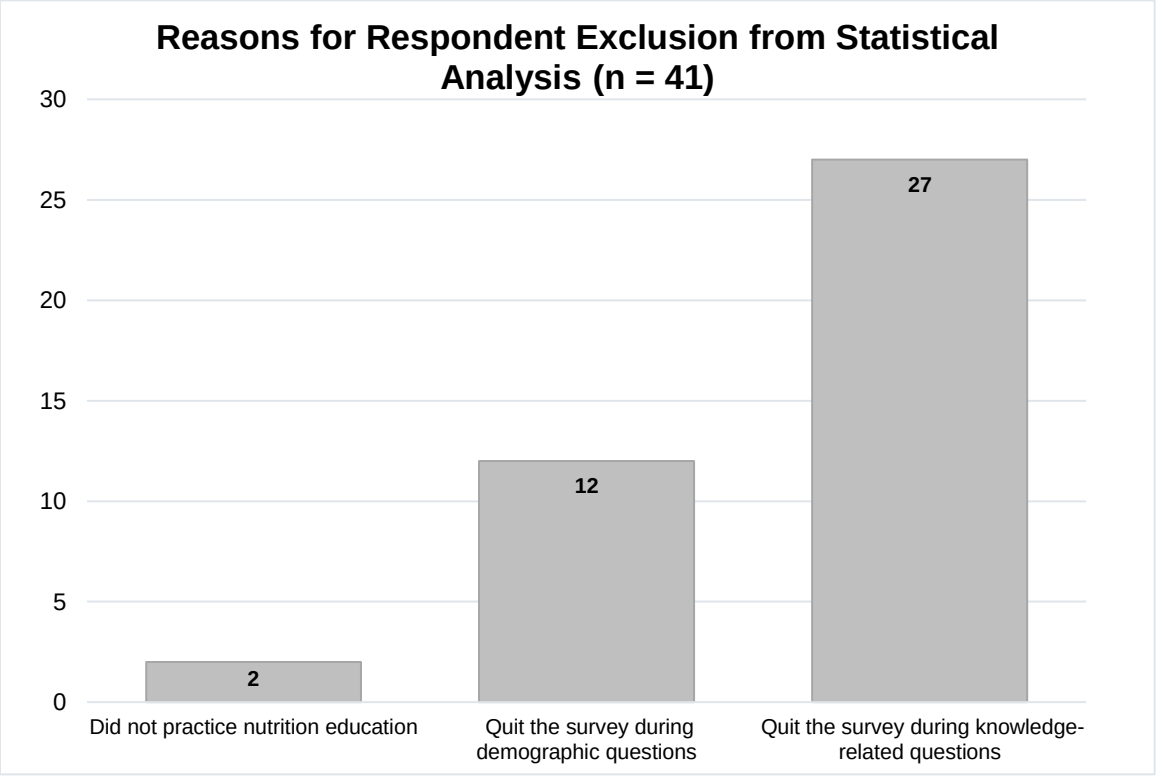


Figure 1. Reasons for respondent exclusion from statistical analysis.

Another limitation to the study is the validity of the data collection tool. The knowledge questions have not been tested for validity, so it is unknown if they effectively assess agents' true knowledge of fad diets and risks. The time of year data collection occurred may have unintentionally excluded some agents, as agents may not have had the chance to complete the survey if they were on sick leave or vacation. There was a

challenge noted when attempting to find factors that largely influence FCS agents' knowledge when all agents come from a variety of different backgrounds. Some respondents were registered dietitians, while others were certified teachers, personal trainers, certified family life educators, or licensed massage therapists, to name a few. Finally, while there was a significant association between higher knowledge scores and certain certifications, only thirteen survey respondents were RDNs or DTRs and only three had the CHES certification, so further research would be needed to substantiate this association.

The results of this study could prompt further exploration into FCS agents' continuing education needs and factors that may influence their knowledge. Future research should examine agents' knowledge of other trending nutrition topics, agents' utilization of professional development opportunities from associations in which they are members, and overall nutrition knowledge of agents with different certifications. Future studies could also evaluate this study's topic in more detail, possibly reaching samples of agents from states other than Louisiana, Texas, Arkansas, and Mississippi. Subsequent research should examine the potential association between knowledge of fad diets and CHES, RDN, and DTR certifications. Those with the highest knowledge scores may have identified the type of agents who should provide training for other agents.

An integral component of providing effective professional development opportunities to agents is understanding their preferred information delivery methods. The survey assessed respondents' preferred resources to learn about fad diets. When asked what resources they would prefer, the majority of respondents (80%) chose webinars. Participating state offices can use this information to teach their agents in an

effective and meaningful way. Survey respondents' preferred delivery methods for learning about fad diets, including answers respondents gave separate from the answer choices provided, are listed in Table 17.

Table 17.

Respondents' Preferred Information Delivery Methods to Learn About Fad Diets

Resources	Percentage of respondents (%)
Webinars	80%
Online modules	63%
Statewide trainings	62%
Conference sessions	47%
Journal articles	30%
Other	15%

Note: Preferred learning resources are listed in descending order of frequency.

When asked if they had ever tried one of the fad diets mentioned in the survey, over half (54%) of agents reported they had never tried any of them. Low-carbohydrate diets were most frequently tried out of the diets in the survey (35%). Table 18 reveals the fad diets tried by survey respondents.

Table 18.

Respondents Who Had Tried the Diets Mentioned in the Survey

Diet	Percentage of respondents (%)
Haven't tried any of the diets mentioned	54%
Low-carbohydrate diet	35%
Intermittent fasting	20%
Cleanse	8%
Ketogenic diet	8%
Detox	5%

Note: Diets tried by respondents are listed in descending order of frequency.

Over the last decade, there has been a rise in demand for nutrition and health-related programs due to an increased need for improved population health among communities across the nation (Kaufman et al., 2017). CES has evolved to meet the needs of communities by placing a greater focus on nutrition and health programming within family and consumer sciences (Kaufman et al., 2017). As the progression from home economics to nutrition and health in CES continues to grow and develop, there will be a greater demand for nutrition and dietetics professionals, such as RDNs and DTRs. In conclusion, a significant association was observed with fad diet adverse effect knowledge scores and RDN, DTR, and CHES certifications. Agents who held these certifications had higher adverse effects knowledge scores for fad diets. Results of this study indicate the benefits of hiring CES professionals with these nutrition and health-related certifications. Further research is needed to validate the association identified in this study.

APPENDIX A

A-1 DATA COLLECTION INSTRUMENT

A-2 SURVEY ANSWER KEY

A-3 SURVEY SCORING TOOL

A-1 Data Collection Instrument

A Multi-State Evaluation of the Knowledge of the Background and Dangers of Popular Fad Diets Among Cooperative Extension Agents in Family and Consumer Sciences

PURPOSE OF STUDY/PROJECT: To assess the background knowledge of popular fad diets and their dangers among FCS cooperative extension agents in southern states in relation to factors that may influence knowledge.

PROCEDURE: In order to better understand professional development needs of family and consumer sciences agents, we would like to assess current knowledge about popular fad diets. This will help guide development of future continuing education opportunities for agents in our field. The survey will take about 10-20 minutes to complete. All information will be kept confidential and the information will only be used to assess current knowledge and influencing factors. To proceed with the survey, press "OK" and then answer "yes" to the statement below, "I agree to participate in this study." If you select "no," the survey will end.

INSTRUMENTS: Online Fad Diets Survey

RISKS/ALTERNATIVE TREATMENTS: I understand this is a descriptive study therefore there is no predicted risk. Should I wish to withdraw from the survey early, I can do so by exiting the website.

BENEFITS/COMPENSATION:
I have read and understand the following description of the study, "A multi-state evaluation of the knowledge of the background and dangers of popular fad diets among cooperative extension agents in family and consumer sciences" and the research purpose and methods. I understand that my participation in this research is strictly voluntary. My participation or refusal to participate in this study will not affect my relationship with local, state, or national cooperative extension services or with Louisiana Tech University. Further, I understand that I may withdraw at any time to answer any questions without penalty. Upon completion of the study, I understand that the results will be available to me freely and upon request. I understand that results of my survey will be confidential and available only to the principal investigators, myself, or a legally appointed representative. I have not been requested to waive nor do I waive any of my rights related to participating in this study. I am over 18 years of age and am employed by cooperative extension services.
Upon completion of the survey, I understand that I am eligible to enter into a raffle for a $25 Amazon gift card. Participation in the raffle is voluntary.

1. I agree to participate in this study.
   - ☐ Yes
   - ☐ No

Thank you for participating in the survey. It should take about 10-20 minutes to complete.
Please answer the questions below.

1. Which of the following describe your area of practice in extension? Check all that apply.
   - ☐ General Nutrition Education
   - ☐ Food Safety
   - ☐ Weight Control
   - ☐ Diabetes Management
   - ☐ EFNEP
   - ☐ I do not practice nutrition education

Participants who answer "I do not practice nutrition education" will be rolled out of the survey after their answer. The survey will end with "Thank you for your participation."

2. How many years have you worked in cooperative extension?
   _____

3. Which of the following professional organizations do you hold a membership? Check all that apply.
   - ☐ NEAFCS
   - ☐ SNEB
   - ☐ Academy of Nutrition & Dietetics
   - ☐ Other: _____

4. Where do you obtain current information about fad diets? Check all that apply.
   - ☐ Journal articles
   - ☐ Wikipedia
   - ☐ .edu websites
   - ☐ .gov websites
   - ☐ .org websites
   - ☐ .com websites
   - ☐ .net websites
   - ☐ Personal testimonials
   - ☐ Statewide trainings
   - ☐ Information shared by colleagues
   - ☐ Conference sessions
   - ☐ Webinars
   - ☐ Textbooks
   - ☐ Magazines
   - ☐ Social media
   - ☐ I have never received any information about fad diets
   - ☐ Other: _____

5. What is your highest education level?
   - Bachelor's degree
   - Some graduate coursework
   - Master's degree
   - Doctorate

6. Which of the following certifications do you hold? Check all that apply.
   - Extension Specialist
   - RDN
   - DTR
   - CHES
   - CHC
   - MCHES
   - CFCS
   - Other: _____

7. In which state are you employed?
   - Louisiana
   - Texas
   - Arkansas
   - Mississippi

8. What is your gender?
   - Male
   - Female
   - Other/I prefer not to disclose

Please answer the following questions to the best of your knowledge.

9. Which of the following foods contain carbohydrates? Check all boxes that apply.
   - Black coffee
   - Canola oil
   - Bread
   - Fruit
   - Butter
   - Wine
   - Honey
   - Tuna
   - Kidney beans

10. Low-carbohydrate diets are those with a total carbohydrate intake of less than _____ of total calorie intake:
    a) 55%
    b) 35%
    c) 45%
    d) 25%

11. Most low-carbohydrate diets replace carbohydrates with _____.
    a) Water
    b) Protein
    c) Fat
    d) Fiber

12. Which of the following are low-carbohydrate diets?
    - ☐ Weight Watchers
    - ☐ Zone Diet
    - ☐ Ideal Protein
    - ☐ Ketogenic Diet
    - ☐ Vegetarian Diet
    - ☐ South Beach Diet
    - ☐ Atkins Diet
    - ☐ MyPlate

13. What is intermittent fasting?
    a) A diet pattern characterized by restriction of certain foods during certain times of the day according to your blood type.
    b) A diet pattern characterized by elimination of carbohydrates on certain days.
    c) A diet pattern characterized by severe restriction of calories on certain days or hours of the day.
    d) A diet pattern characterized by elimination of dairy on certain days.
    e) A diet pattern characterized by restriction of solid foods during the week.

14. Which of the following are types of intermittent fasting? Check all that apply.
    - ☐ Skipping certain meals
    - ☐ Eating a balanced diet with 3 meals each day
    - ☐ Eliminating red meats 3 days of the week
    - ☐ Fasting 2 days of the week
    - ☐ Restricting carbohydrates during high-stress events
    - ☐ Fasting alternate days of the week
    - ☐ Fasting during exercise
    - ☐ Restricting dairy during the day if your blood type is AB
    - ☐ Eating at night and fasting during the day
    - ☐ Severely restricting calories 2 days of the week
    - ☐ Avoiding dairy 4 days of the week

15. What is the most popular method of intermittent fasting used today?
    a) Eliminating fruits during the weekdays
    b) Fasting for two days and normal intake for five days
    c) Fasting for five days and normal intake for two days
    d) Restricting carbohydrates during the weekdays
    e) None of the above

16. When comparing weight loss from intermittent fasting with weight loss from moderate daily calorie restriction, intermittent fasting is:
    a) Less effective
    b) More effective
    c) More effective if paired with a ketogenic diet
    d) Neither less effective nor more effective—results are inconclusive

17. True or False? Detoxes and cleanse diets remove toxins and impurities from the body, which revives your organs and biochemical function.
    - ☐ True
    - ☐ False

18. The term “toxin”, when referenced in detox and cleanse diets, includes which of the following? Check all that apply.
    - ☐ Processed foods
    - ☐ Herbal medicines
    - ☐ Heavy metals
    - ☐ Carbohydrates
    - ☐ Synthetic chemicals
    - ☐ Caffeine
    - ☐ Water
    - ☐ Environmental pollutants
    - ☐ “Other potentially harmful products”

19. The majority of weight lost during a detox or cleanse is:
    a) Water
    b) Fat
    c) Muscle
    d) A combination of all three

20. Which of the following methods are used in detoxes and cleanses? Check all that apply.
    - ☐ Complete starvation
    - ☐ Use of laxatives
    - ☐ A balanced diet
    - ☐ Juice fasts
    - ☐ Food modifications
    - ☐ Smaller portions
    - ☐ Focus on specific vitamins and minerals
    - ☐ Use of diuretics
    - ☐ MyPlate
    - ☐ Use of foods that "cleanse" the body

21. Low carbohydrate diets are often high in _____, which leads to _____.
    a) Soluble fiber, improved gastrointestinal health
    b) Protein, hormonal imbalances
    c) Protein, increased muscle mass
    d) Saturated fat, cardiovascular issues
    e) Potassium, improved blood pressure

22. In women who are pregnant or planning to become pregnant, a low-carbohydrate diet may increase the likelihood of:
    a) Healthy birth weight
    b) Preeclampsia
    c) Neural tube defects
    d) Mood stabilization
    e) Fluid retention

23. One of the major changes in cardiovascular markers seen in those who follow a low-carbohydrate diet, which increases risk for heart issues, is:
    a) Increased HDL cholesterol
    b) Increased LDL cholesterol
    c) Decreased LDL cholesterol
    d) Decreased HDL cholesterol
    e) None of the above—a low carbohydrate diet has never been shown to influence cardiovascular risk

24. Low carbohydrate diets may have which of the following effects? Check all that apply.
    - ☐ Increased blood calcium levels
    - ☐ Increased LDL cholesterol levels
    - ☐ Halitosis
    - ☐ Fatigue
    - ☐ Hyperthermia
    - ☐ Increased risk for esophageal cancer
    - ☐ Decreased mortality risk
    - ☐ Increased mortality risk
    - ☐ Reversal of diabetes (Type 1)
    - ☐ Dysgeusia

25. Which of the following effects have been seen as a result of intermittent fasting? Check all that apply.
    - ☐ Reversal of the effects of aging
    - ☐ Increased susceptibility to bowel polyps
    - ☐ Increased risk of osteoporosis
    - ☐ Blockage of carcinogens in the body
    - ☐ Early onset of menopause
    - ☐ Irregular menstruation
    - ☐ Heightened stress
    - ☐ Increased incidence of dystonia
    - ☐ Dry mouth
    - ☐ Night sweats

26. Intermittent fasting may cause which of the following for those with Type 2 diabetes? Check all that apply.
    - ☐ Insulin resistance
    - ☐ Retinopathy
    - ☐ Decreased insulin resistance
    - ☐ Hypoglycemia
    - ☐ Hyperglycemia
    - ☐ Increased fat burning
    - ☐ Diabetic ketoacidosis
    - ☐ Dehydration
    - ☐ Improved nerve function
    - ☐ Lipohypertrophy

27. Intermittent fasting may cause_____ in athletes.
    a) Enhanced performance
    b) Fatigue
    c) Muscle cramps
    d) Decreased injury incidence
    e) Sarcopenia

28. Which of the following can be consequences of detoxes and cleanses?
    - ☐ Nutrient deficiencies
    - ☐ Edema
    - ☐ Infertility
    - ☐ Acne
    - ☐ Warts
    - ☐ Electrolyte abnormalities
    - ☐ Dehydration
    - ☐ Norovirus
    - ☐ Pancreatitis
    - ☐ Lactic acidosis
    - ☐ Gum disease
    - ☐ Atrial septal defect
    - ☐ Vomiting
    - ☐ Hemophilia
    - ☐ Heart failure
    - ☐ Acute kidney insufficiency

29. Side effects seen in detoxes and cleanses:
    a) Vary depending on the person
    b) Vary depending on the regimen
    c) Are, for the most part, similar regardless of the person or regimen
    d) Both a and b
    e) No side effects are seen in detoxes and cleanses.

30. Side effects experienced by those doing detoxes and cleanses:
    a) Are generally always mild
    b) Are usually always clinically severe
    c) Can be mild or severe depending on the regimen
    d) No side effects are seen in detoxes and cleanses.

31. If there were resources available to learn more about fad diets, which would you prefer? Check all that apply.
    - ☐ Webinars
    - ☐ Conference sessions
    - ☐ Journal articles
    - ☐ Online modules
    - ☐ Statewide trainings
    - ☐ Other: _____

32. Which of the following diets, if any, have you tried yourself? Check all that apply.
    - ☐ Intermittent fasting
    - ☐ Low-carbohydrate
    - ☐ Ketogenic
    - ☐ Detox
    - ☐ Cleanse

Thank you for your participation! You are now eligible to be entered into a raffle for a $25 Amazon gift card. If you would like to be entered into the raffle, please text "Bulldogs" to 972-322-9513.

A-2 Survey Answer Key

Question	Correct Answers	Incorrect Answers
Which of the following foods contain carbohydrates? Check all boxes that apply.	Bread Fruit Wine Honey Kidney beans	Black coffee Canola oil Butter Tuna
Low-carbohydrate diets entail a total carbohydrate intake of less than _____ of your total daily calorie intake.	45%	55% 35% 25%
Most low-carbohydrate diets replace carbohydrates with _____.	Fat	Water Protein Fiber
Which of the following are low-carbohydrate diets?	Zone Diet Ideal Protein Ketogenic Diet South Beach Diet Atkins Diet	Weight Watchers Vegetarian Diet MyPlate
What is intermittent fasting?	A diet pattern characterized by severe restriction of calories on certain days or hours of the day.	A diet pattern characterized by restriction of certain foods during certain times of the day according to your blood type. A diet pattern characterized by elimination of carbohydrates on certain days. A diet pattern characterized by elimination of dairy on certain days. A diet pattern characterized by restriction of solid foods during the week.

Question	Correct Answers	Incorrect Answers
Which of the following are types of intermittent fasting? Check all that apply.	Skipping certain meals Fasting 2 days of the week Fasting alternate days of the week Eating at night and fasting during the day Severely restricting calories 2 days of the week	Eating a balanced diet with 3 meals each day Eliminating red meats 3 days of the week Restricting carbohydrates during high-stress events Fasting during exercise Restricting dairy during the day if your blood type is AB Avoiding dairy 4 days of the week
What is said to be the most popular method of intermittent fasting?	Fasting for two days and normal intake for five days	Eliminating fruits during the weekdays Fasting for five days and normal intake for two days Restricting carbohydrates during the weekdays None of the above
When comparing weight loss from intermittent fasting with weight loss from moderate daily calorie restriction, intermittent fasting is:	Neither less effective nor more effective—results are inconclusive	Less effective More effective More effective if paired with a ketogenic diet
True or False? Detoxes and cleanse diets remove toxins and impurities from the body, which revives your organs and biochemical function.	False	True
The term “toxin”, when referenced in detox and cleanse diets, includes which of the following? Check all that apply.	Processed foods Heavy metals Synthetic chemicals Environmental pollutants “Other potentially harmful products”	Herbal medicines Phytochemicals Caffeine Linoleic acid

Question	Correct Answers	Incorrect Answers
The majority of weight lost during a detox or cleanse is:	Water	Fat Muscle A combination of all three
Which of the following methods are used in detoxes and cleanses? Check all that apply.	Complete starvation Use of laxatives Juice fasts Food modifications Focus on specific vitamins and minerals Use of diuretics Use of foods that "cleanse" the body	A balanced diet Smaller portions MyPlate
Low carbohydrate diets are often high in _____, which leads to _____.	Saturated fat, cardiovascular issues	Soluble fiber, improved gastrointestinal health Protein, hormonal imbalances Protein, increased muscle mass Potassium, improved blood pressure
In women who are pregnant or planning to become pregnant, a low-carbohydrate diet may increase the likelihood of:	Neural tube defects	Healthy birth weight Preeclampsia Mood stabilization Fluid retention
One of the major changes in cardiovascular markers seen in those who follow a low-carbohydrate diet, which increases risk for heart issues, is:	Increased LDL cholesterol	Increased HDL cholesterol Decreased LDL cholesterol Decreased HDL cholesterol None of the above—a low carbohydrate diet has never been shown to influence cardiovascular risk
Low carbohydrate diets may have which of the following effects? Check all that apply.	Increased LDL cholesterol levels Halitosis Fatigue Increased risk for esophageal cancer Increased mortality risk	Increased blood calcium levels Hyperthermia Decreased mortality risk Reversal of diabetes (Type 1) Dysgeusia

Question	Correct Answers	Incorrect Answers
Which of the following effects have been seen as a result of intermittent fasting? Check all that apply.	Increased risk of osteoporosis Early onset of menopause Irregular menstruation Heightened stress	Reversal of the effects of aging Increased susceptibility to bowel polyps Blockage of carcinogens in the body Increased incidence of dystonia Dry mouth Night sweats
Intermittent fasting may cause which of the following for those with Type 2 diabetes? Check all that apply.	Insulin resistance Hypoglycemia Hyperglycemia Diabetic ketoacidosis Dehydration	Retinopathy Decreased insulin resistance Increased fat burning Improved nerve function Lipohypertrophy
Intermittent fasting may cause _____ in athletes.	Fatigue	Enhanced performance Muscle cramps Decreased injury incidence Sarcopenia
Which of the following can be consequences of detoxes and cleanses?	Nutrient deficiencies Electrolyte abnormalities Dehydration Pancreatitis Lactic acidosis Vomiting Heart failure Acute kidney insufficiency	Edema Infertility Acne Warts Norovirus Gum disease Atrial septal defect Hemophilia
Side effects seen in detoxes and cleanses:	Both a and b	Vary depending on the person Vary depending on the regimen Are, for the most part, similar regardless of the person or regimen No side effects are seen in detoxes and cleanses.
Side effects experienced by those doing detoxes and cleanses:	Can be mild or severe depending on the regimen	Are generally always mild Are usually always clinically severe No side effects are seen in detoxes and cleanses.

A-3 Survey Scoring Tool

Question	Answer (+1 point if correct)
Which of the following foods contain carbohydrates? Black coffee Canola oil Bread Fruit Butter Wine Honey Tuna Kidney beans	
Low-carbohydrate diets entail a total carbohydrate intake of less than _____ of your total daily calorie intake. 55% 35% 45% 25%	
Most low-carbohydrate diets replace carbohydrates with _____. Water Protein Fat Fiber	
Which of the following are low-carbohydrate diets? Weight Watchers Zone Diet Ideal Protein Ketogenic Diet Vegetarian Diet South Beach Diet Atkins Diet MyPlate	
Low-Carbohydrate Diet Knowledge Score (out of 19)	

Question	Answer (+1 point if correct)
What is intermittent fasting? A diet pattern characterized by restriction of certain foods during certain times of the day according to your blood type. A diet pattern characterized by elimination of carbohydrates on certain days. A diet pattern characterized by severe restriction of calories on certain days or hours of the day. A diet pattern characterized by elimination of dairy on certain days. A diet pattern characterized by restriction of solid foods during the week.	
Which of the following are types of intermittent fasting? Skipping certain meals Eating a balanced diet with 3 meals each day Eliminating red meats 3 days of the week Fasting 2 days of the week Restricting carbohydrates during high-stress events Fasting alternate days of the week Fasting during exercise Restricting dairy during the day if your blood type is AB Eating at night and fasting during the day Severely restricting calories 2 days of the week Avoiding dairy 4 days of the week	
What is the most popular method of intermittent fasting used today? Eliminating fruits during the weekdays Fasting for two days and normal intake for five days Fasting for five days and normal intake for two days Restricting carbohydrates during the weekdays None of the above	
When comparing weight loss from intermittent fasting with weight loss from moderate daily calorie restriction, intermittent fasting is: Less effective More effective More effective if paired with a ketogenic diet Neither less effective nor more effective—results are inconclusive	
Intermittent Fasting Knowledge Score (out of 14)	

Question	Answer (+1 point if correct)
True or False? Detoxes and cleanse diets remove toxins and impurities from the body, which revives your organs and biochemical function.	
The term "toxin," when referenced in detox and cleanse diets, includes which of the following? Processed foods Herbal medicines Heavy metals Carbohydrates Synthetic chemicals Caffeine Water Environmental pollutants "Other potentially harmful products"	
The majority of weight lost during a detox or cleanse is: Water Fat Muscle A combination of all three	
Which of the following methods are used in detoxes and cleanses? Complete starvation Use of laxatives A balanced diet Juice fasts Food modifications Smaller portions Focus on specific vitamins and minerals Use of diuretics MyPlate Use of foods that "cleanse" the body	
Side effects seen in detoxes and cleanses: Vary depending on the person Vary depending on the regimen Are, for the most part, similar regardless of the person or regime Both a and b No side effects are seen in detoxes and cleanses.	
Side effects experienced by those doing detoxes and cleanses: Are generally always mild Are usually always clinically severe Can be mild or severe depending on the regimen No side effects are seen in detoxes and cleanses.	
Detox/Cleanse Diet Knowledge Score (out of 23)	
Fad Diets Knowledge Score (out of 56)	

Question	Answer (+1 point if correct)
Low carbohydrate diets are often high in _____, which leads to _____. Soluble fiber, improved gastrointestinal health Protein, hormonal imbalances Protein, increased muscle mass Saturated fat, cardiovascular issues Potassium, improved blood pressure	
In women who are pregnant or planning to become pregnant, a low-carbohydrate diet may increase the likelihood of: Healthy birth weight Preeclampsia Neural tube defects Mood stabilization Fluid retention	
One of the major changes in cardiovascular markers seen in those who follow a low-carbohydrate diet, which increases risk for heart issues, is: Increased HDL cholesterol Increased LDL cholesterol Decreased LDL cholesterol Decreased HDL cholesterol None of the above—a low carbohydrate diet has never been shown to influence cardiovascular risk	
Low carbohydrate diets may have which of the following effects? Increased blood calcium levels Increased LDL cholesterol levels Halitosis Fatigue Hyperthermia Increased risk for esophageal cancer Decreased mortality risk Increased mortality risk Reversal of diabetes (Type 1) Dysgeusia	
Low-Carbohydrate Adverse Effects Knowledge Score (out of 13)	

Question	Answer (+1 point if correct)
Which of the following effects have been seen as a result of intermittent fasting? Reversal of the effects of aging Increased susceptibility to bowel polyps Increased risk of osteoporosis Blockage of carcinogens in the body Early onset of menopause Irregular menstruation Heightened stress Increased incidence of dystonia Dry mouth Night sweats	
Intermittent fasting may cause which of the following for those with Type 2 diabetes? Insulin resistance Retinopathy Decreased insulin resistance Hypoglycemia Hyperglycemia Increased fat burning Diabetic ketoacidosis Dehydration Improved nerve function Lipohypertrophy	
Intermittent fasting may cause _____ in athletes. Enhanced performance Fatigue Muscle cramps Decreased injury incidence Sarcopenia	
Intermittent Fasting Adverse Effects Knowledge Score (out of 21)	

Question	Answer (+1 point if correct)
Which of the following can be consequences of detoxes and cleanses? Nutrient deficiencies Edema Infertility Acne Warts Electrolyte abnormalities Dehydration Norovirus Pancreatitis Lactic acidosis Gum disease Atrial septal defect Vomiting Hemophilia Heart failure Acute kidney insufficiency	
Detox/Cleanse Adverse Effects Knowledge Score (out of 16)	
Fad Diets Adverse Effects Knowledge Score (out of 50)	
Total score (out of 106)	

APPENDIX B

B-1 HUMAN USE COMMITTEE APPROVAL LETTERS

B-2 STATE OFFICE APPROVAL LETTERS

B-3 STATE OFFICE GENERAL EMAIL MESSAGE TEMPLATE

B-1 Human Use Committee Approval Letters

LOUISIANA TECH UNIVERSITY

MEMORANDUM

OFFICE OF SPONSORED PROJECTS

TO: Ms. Abigail McAlister and Dr. Vicky Green

FROM: Dr. Richard Kordal, Director of Intellectual Property & Commercialization (OIPC)
rkordal@latech.edu

SUBJECT: HUMAN USE COMMITTEE REVIEW

DATE: August 19, 2019

In order to facilitate your project, an EXPEDITED REVIEW has been done for your proposed study entitled:

"A Multi-state Evaluation of the Knowledge of the Background and Dangers of Popular Fad Diets among Cooperative Extension Agents in Family and Consumer Sciences"

HUC 20-009

The proposed study's revised procedures were found to provide reasonable and adequate safeguards against possible risks involving human subjects. The information to be collected may be personal in nature or implication. Therefore, diligent care needs to be taken to protect the privacy of the participants and to assure that the data are kept confidential. Informed consent is a critical part of the research process. The subjects must be informed that their participation is voluntary. It is important that consent materials be presented in a language understandable to every participant. If you have participants in your study whose first language is not English, be sure that informed consent materials are adequately explained or translated. Since your reviewed project appears to do no damage to the participants, the Human Use Committee grants approval of the involvement of human subjects as outlined.

Projects should be renewed annually. ***This approval was finalized on August 19, 2019 and this project will need to receive a continuation review by the IRB if the project continues beyond August 19, 2020.*** **ANY CHANGES** to your protocol procedures, including minor changes, should be reported immediately to the IRB for approval before implementation. Projects involving NIH funds require annual education training to be documented. For more information regarding this, contact the Office of Sponsored Projects.

You are requested to maintain written records of your procedures, data collected, and subjects involved. These records will need to be available upon request during the conduct of the study and retained by the university for three years after the conclusion of the study. If changes occur in recruiting of subjects, informed consent process or in your research protocol, or if unanticipated problems should arise it is the Researchers responsibility to notify the Office of Sponsored Projects or IRB in writing. The project should be discontinued until modifications can be reviewed and approved.

Please be aware that you are responsible for reporting any adverse events or unanticipated problems.

LOUISIANA TECH
UNIVERSITY

MEMORANDUM

OFFICE OF SPONSORED PROJECTS

TO: Ms. Abigail McAlister and Dr. Vicky Green

FROM: Dr. Richard Kordal, Director of Intellectual Property & Commercialization (OIPC)
rkordal@latech.edu

SUBJECT: HUMAN USE COMMITTEE REVIEW

DATE: August 27, 2019

In order to facilitate your project, an EXPEDITED REVIEW has been done for your proposed study entitled:

"A Multi-state Evaluation of the Knowledge of the Background and Dangers of Popular Fad Diets among Cooperative Extension Agents in Family and Consumer Sciences"

HUC 20-009 Amendment
(Added email to be sent to extension service employees)

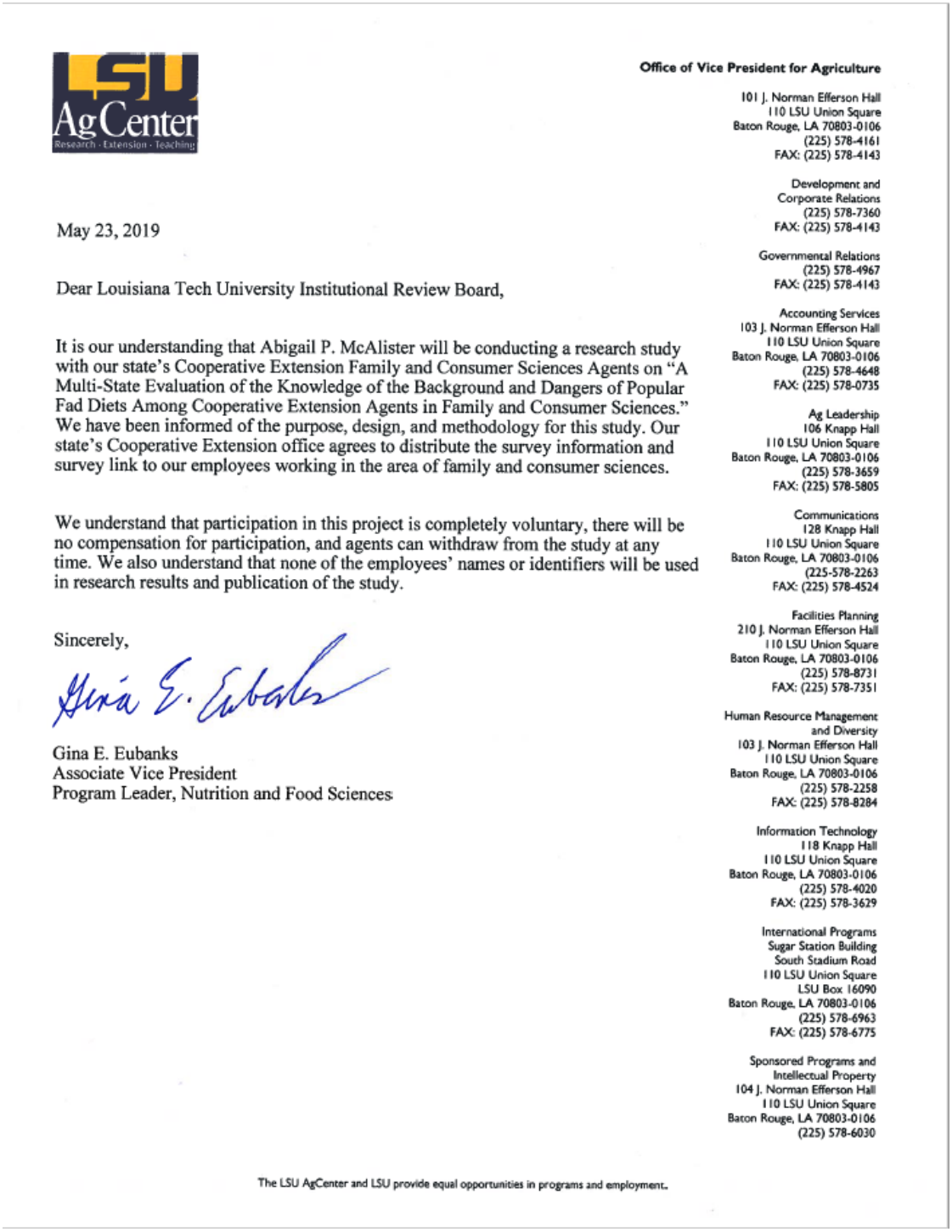
The proposed study's revised procedures were found to provide reasonable and adequate safeguards against possible risks involving human subjects. The information to be collected may be personal in nature or implication. Therefore, diligent care needs to be taken to protect the privacy of the participants and to assure that the data are kept confidential. Informed consent is a critical part of the research process. The subjects must be informed that their participation is voluntary. It is important that consent materials be presented in a language understandable to every participant. If you have participants in your study whose first language is not English, be sure that informed consent materials are adequately explained or translated. Since your reviewed project appears to do no damage to the participants, the Human Use Committee grants approval of the involvement of human subjects as outlined.

Projects should be renewed annually. ***This approval was finalized on August 27, 2019 and this project will need to receive a continuation review by the IRB if the project continues beyond August 27, 2020.*** **ANY CHANGES** to your protocol procedures, including minor changes, should be reported immediately to the IRB for approval before implementation. Projects involving NIH funds require annual education training to be documented. For more information regarding this, contact the Office of Sponsored Projects.

You are requested to maintain written records of your procedures, data collected, and subjects involved. These records will need to be available upon request during the conduct of the study and retained by the university for three years after the conclusion of the study. If changes occur in recruiting of subjects, informed consent process or in your research protocol, or if unanticipated problems should arise it is the Researchers responsibility to notify the Office of Sponsored Projects or IRB in writing. The project should be discontinued until modifications can be reviewed and approved.

Please be aware that you are responsible for reporting any adverse events or unanticipated problems.

B-2 State Office Approval Letters



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Intellectual Property
104 J. Norman Efferson Hall
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May 23, 2019

Dear Louisiana Tech University Institutional Review Board,

It is our understanding that Abigail P. McAlister will be conducting a research study with our state's Cooperative Extension Family and Consumer Sciences Agents on "A Multi-State Evaluation of the Knowledge of the Background and Dangers of Popular Fad Diets Among Cooperative Extension Agents in Family and Consumer Sciences." We have been informed of the purpose, design, and methodology for this study. Our state's Cooperative Extension office agrees to distribute the survey information and survey link to our employees working in the area of family and consumer sciences.

We understand that participation in this project is completely voluntary, there will be no compensation for participation, and agents can withdraw from the study at any time. We also understand that none of the employees' names or identifiers will be used in research results and publication of the study.

Sincerely,

Gina E. Eubanks
Associate Vice President
Program Leader, Nutrition and Food Sciences

DEPARTMENT OF NUTRITION & FOOD SCIENCE

TEXAS A&M AGRILIFE EXTENSION

June 17, 2019

Dear Louisiana Tech University Institutional Review Board,

It is our understanding that Abigail P. McAlister will be conducting a research study with our state's Cooperative Extension Family and Consumer Sciences Agents on "A Multi-State Evaluation of the Knowledge of the Background and Dangers of Popular Fad Diets Among Cooperative Extension Agents in Family and Consumer Sciences." We have been informed of the purpose, design, and methodology for this study. Our state's Cooperative Extension office agrees to distribute the survey information and survey link to our employees working in the area of family and consumer sciences.

We understand that participation in this project is completely voluntary, there will be no compensation for participation, and agents can withdraw from the study at any time. We also understand that none of the employees' names or identifiers will be used in research results and publication of the study.

Sincerely,

Jenna D. Anding, PhD, LD
Associate Department Head – Extension, Professor & Extension Specialist
Texas A&M AgriLife Extension Service
j-anding@tamu.edu

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University of Arkansas System

Cooperative Extension Service

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6-27-2019

Dear Louisiana Tech University Institutional Review Board,

It is our understanding that Abigail P. McAlister will be conducting a research study with our state's Cooperative Extension Family and Consumer Sciences Agents on "A Multi-State Evaluation of the Knowledge of the Background and Dangers of Popular Fad Diets Among Cooperative Extension Agents in Family and Consumer Sciences." We have been informed of the purpose, design, and methodology for this study. Our state's Cooperative Extension office agrees to distribute the survey information and survey link to our employees working in the area of family and consumer sciences.

We understand that participation in this project is completely voluntary, there will be no compensation for participation, and agents can withdraw from the study at any time. We also understand that none of the employees' names or identifiers will be used in research results and publication of the study.

Sincerely,

RD Cartwright

Rick Cartwright
Associate Vice President for Agriculture-Extension

MISSISSIPPI STATE UNIVERSITY

DEPARTMENT OF FOOD SCIENCE, NUTRITION
AND HEALTH PROMOTION
P. O. Box 9805
Mississippi State, MS 39762
P. 662.325.3200
fsnhp.msstate.edu

July 29, 2019

Dear Louisiana Tech University Institutional Review Board,

It is our understanding that Abigail P. McAlister will be conducting a research study with our state's Cooperative Extension Family and Consumer Sciences Agents on "A Multi-State Evaluation of the Knowledge of the Background and Dangers of Popular Fad Diets Among Cooperative Extension Agents in Family and Consumer Sciences." We have been informed of the purpose, design, and methodology for this study. Our state's Cooperative Extension office agrees to distribute the survey information and survey link to our employees working in the area of family and consumer sciences.

We understand that participation in this project is completely voluntary, there will be no compensation for participation, and agents can withdraw from the study at any time. We also understand that none of the employees' names or identifiers will be used in research results and publication of the study.

Sincerely,

Brent J. Fountain, PhD, RD, CSSD, LD, FAND
Associate Extension Professor
Mississippi State University Extension Human Nutrition Specialist

cc: Dr. Paula Threadgill
Dr. Will Evans

B-3 State Office General Email Message Template

"Greetings,
I am writing to request your participation in my thesis research study.
I'm an extension agent working in Louisiana and I am also a graduate student from Louisiana Tech University. I am doing my thesis research on popular fad diets because this is a topic of interest to me.
The goal of my study is to help identify agents' needs and wants for training and educational opportunities.
The study will be done through an online survey. Please visit the link below to participate:
https://www.surveymonkey.com/r/LFGJTR9

Upon completion of the survey, participants are eligible to enter into a raffle for a $25 Amazon gift card.
If you have any questions, comments, or concerns, feel free to email me at amcalister@agcenter.lsu.edu.

Thanks in advance,

Abigail McAlister, RD, LDN, CHC
Assistant Extension Agent – General Nutrition
LSU AgCenter Northwest Region
318-226-6805"

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